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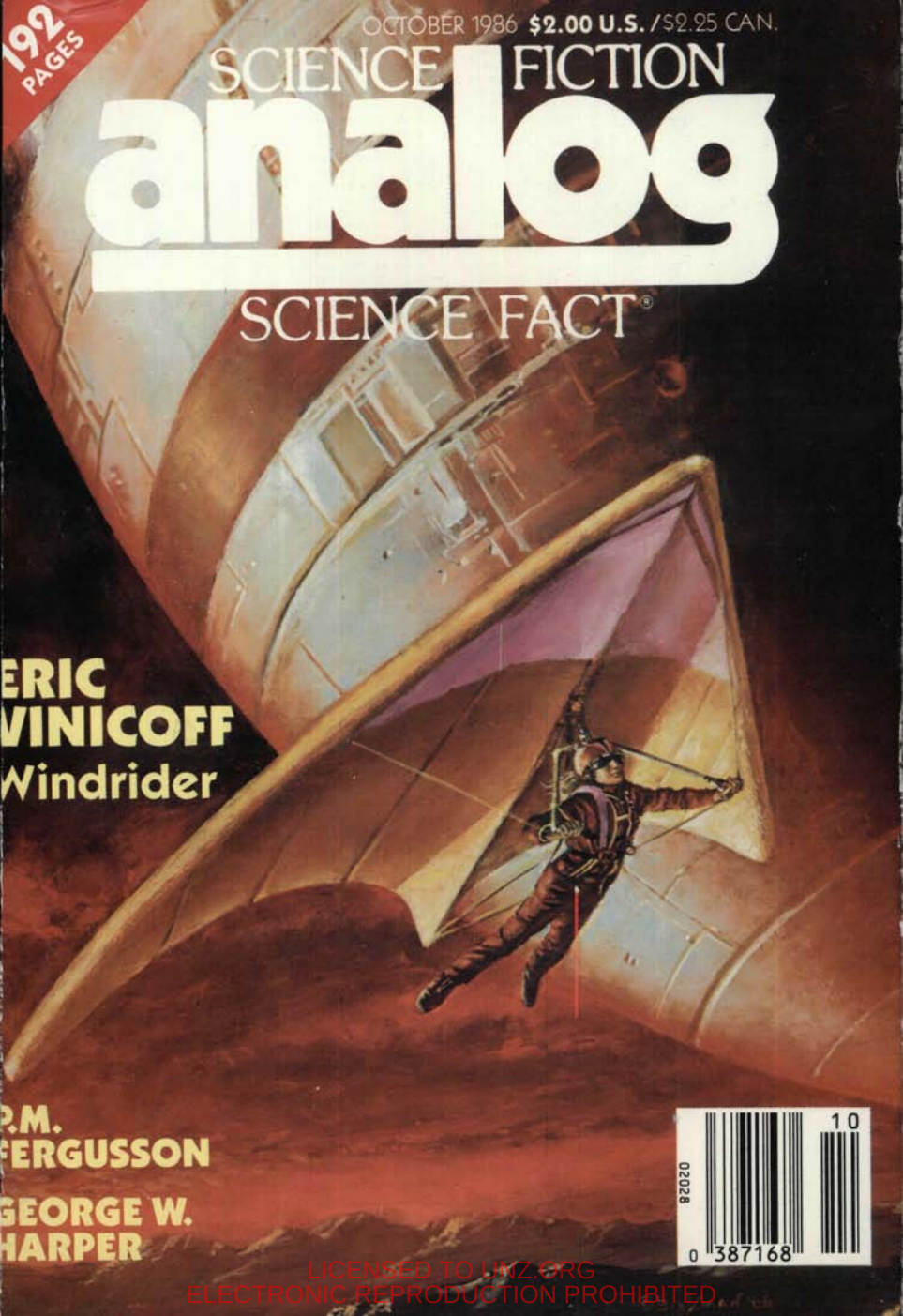

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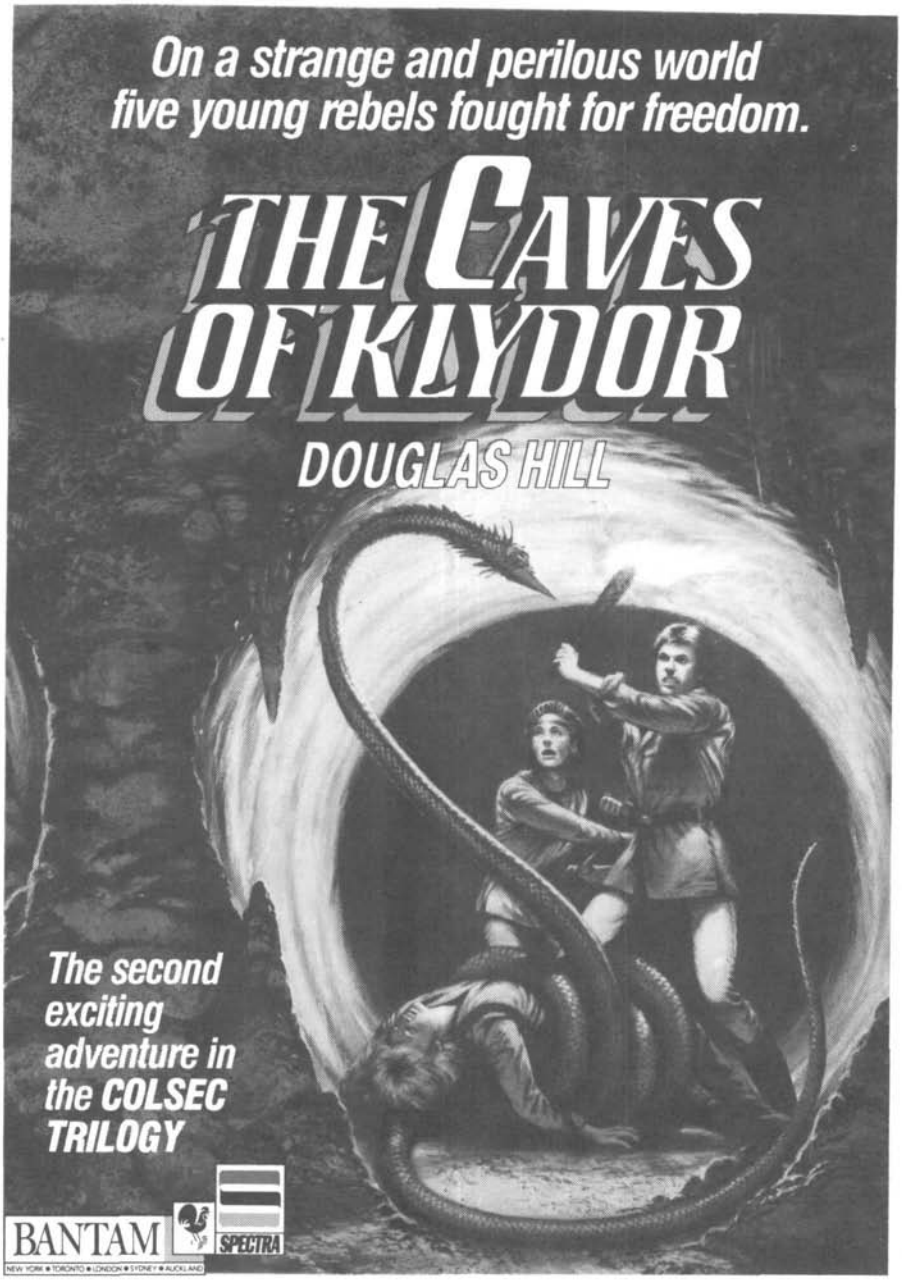
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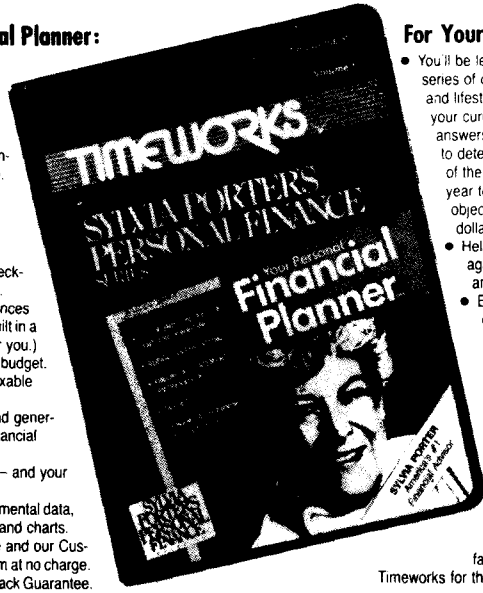

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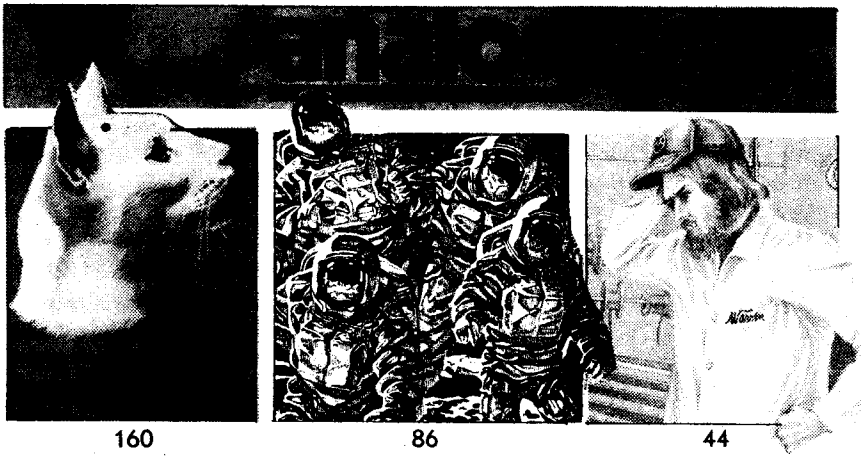

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Vol. CVI No. 10
October 1986

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Editorial

TRICK QUESTIONS

Stanley Schmidt

Most graduate schools include a rite of passage called a "qualifying exam": a massive ordeal that attempts to test a prospective doctor-of-this-or-that's mastery of everything he's supposed to have learned about his field up to that point. Mine was (at least) twelve hours of written tests containing problems in all areas of physics. Those who passed had no further course requirements and could concentrate on thesis research; those who failed had to keep taking courses and go through it all again a few months later. So much was riding on the outcome of "qualifiers" that advisers commonly let their students spend the preceding month or so doing nothing but preparing by doing practice problems from previous years' tests. Few, if any, of the problems were easy; but most were reasonably straightforward once you understood what they were about. I remember one, though, that many of us truly dreaded seeing on *our* qualifier, because we couldn't find any reasonable way to attack it. Much later, I suddenly realized that it was a classic example of that perennial bugaboo of students everywhere, the "trick question."

The problem was this: Consider a cube whose edges are all 1-ohm resistors, soldered together at the corners. What is the resistance measured between diagonally opposite corners of the cube? (Hint: Use a simple equivalent circuit.)

A simple Ohm's law problem, right? OK—draw the equivalent circuit. We were all comfortable with the concept of an equivalent circuit—the idea that two resistors in parallel could be replaced by a single resistor of easily calculable value, for instance, or that a vacuum tube or transistor circuit could

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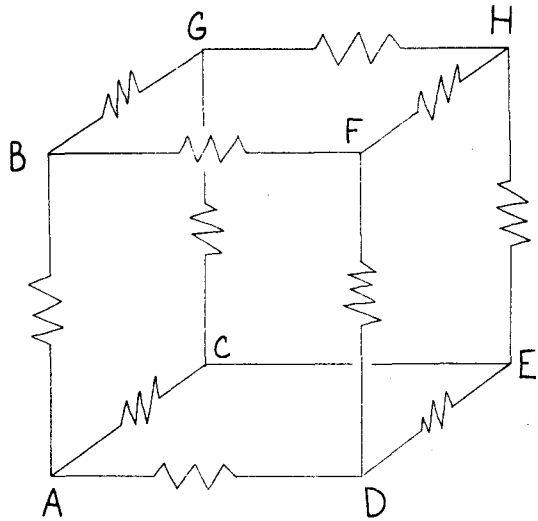

Figure 1

be analyzed most easily by treating the tube or transistor as equivalent (within certain restrictions) to a voltage source in series with a resistance. The "hint" on the resistor cube seemed to all us students to suggest that there was some way to reduce the cubic configuration to some nice two-dimensional combination of series and parallel connections, which would then be trivial to work through. Some of us spent hours trying to come up with such a circuit, but never found one. It seemed there simply *wasn't* any way to draw that resistor combination on a flat piece of paper that didn't look even more complicated than the original. None of us ever made a dent in that problem, and we were greatly relieved that it didn't show up on *our* qualifier.

It was years later, when I was teaching a class of my own some things about the concept of electrical potential and the pervasive importance of symmetry in physics, that this problem popped unbidden back into my head—complete with "obvious" solution. "Eureka!" I thought, even as I talked about something else. "The magic word is equipotential, and the answer is 5/6 ohm." If you imagine yourself to be an electron entering the cube at corner A and trying to decide which way to go, everything looks the same along all three possible paths. Therefore corners B, C, and D are all at the same potential. That means no current would flow between them if they were connected together, so we can assume that they *are* connected together and therefore electrically equivalent to a single point. The same is true of corners E, F, and G, for the same reason. Thus the cube is equivalent to Figure 2, a series combination of three parallel

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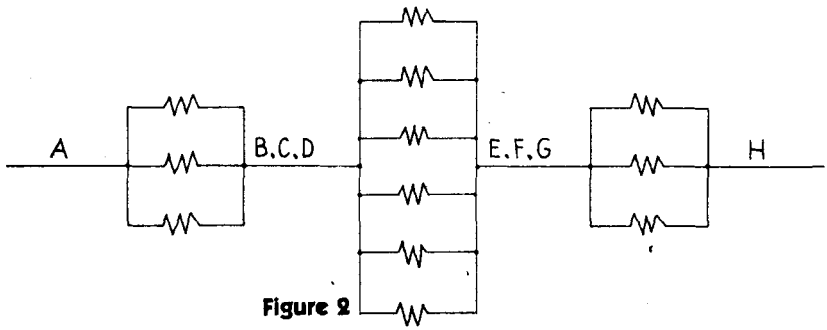

Figure 2

combinations, and since each resistor is 1 ohm, you don't even need paper to see that the total resistance is ⅓ + ⅙ + ⅓ = ⅚ ohm.

So it really is a trivially easy problem, *if* you see the right way to look at it—and fiendishly, almost hopelessly difficult if you don't. We might use that characteristic to define a "trick question"—and go on to observe that the world is full of them.

Over the years I've collected lots of examples from mathematics and the physical sciences. In my first calculus course there was a problem involving an equation which appeared hopelessly complicated, full of logarithms and exponents and logarithms *within* exponents. Our teacher assigned it but warned us not to spend too much time on it if we didn't seem to be getting anywhere. I just glanced at it and said, "What's all the fuss? That's just an absurdly complicated way to write *this*," and read off a much simpler expression. For those of us who happened to notice that the whole ugly mess was just a collection of things like $10^{(\log 10)\log \sin x}$ (which just means "sin x"), it was a non-problem. But there were plenty of people who didn't happen to notice that, and for them it was an insoluble problem.

I once used an astronomy text containing a photograph of the Moon which could have been, at first glance by a person not familiar with the details of lunar topography, either a crescent moon or a partial lunar eclipse. I asked students how to tell which it was, without consulting a map or measuring anything on the picture. The question was trivial for those who recognized that the light-dark boundary on a crescent moon is the terminator, with strong shadows of mountains and craters, while that in a partial eclipse is just the edge of the Earth's shadow on the flat-lighted full moon. It was *not* trivial for those who didn't think of that.

An industrial chemist friend once mentioned that he was having trouble with a problem at work which involved determining the distance between two atoms in a certain molecule. It was a fairly simple molecule, as organic compounds go: not straight or symmetrical, but at least most of it lay in a plane. However, the two atoms of concern lay

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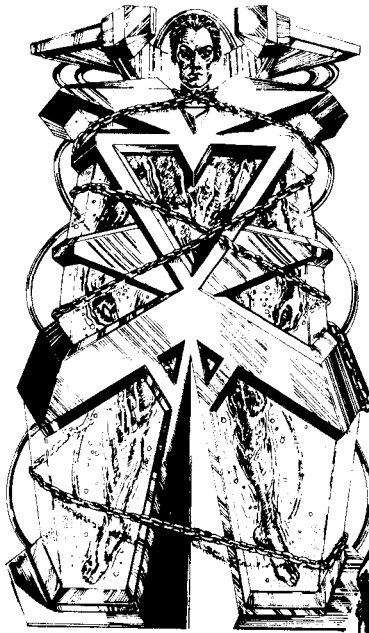

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at the ends of the molecule, one above and one below the plane of the rest, attached by bonds of unequal length and skewed in peculiar directions. The geometry was tricky enough that it was tempting just to build a model and measure it, but I got interested in trying to calculate the distance analytically. With my usual propensity for finding the hard way first, my first solution took three or four pages of tricky geometry and trig. After that I found a way less than half as long but still using some painfully cumbersome vector algebra. By then I was very familiar with what that crazy molecule looked like, and I was finally able to see that there was a way to look at it that made virtually all the complexity vanish and allowed a full solution to be jotted down in about two transparent lines.

But neither of us had any idea what those lines were, or even any confidence that they existed, until we had spent a

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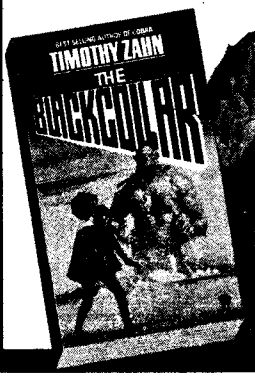

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lot of time and mental energy looking at the problem from less fruitful points of view—some of which didn't work at all, some of which just seemed like digging a swimming pool with a teaspoon.

Now—just how widespread are these things, anyway? I've mentioned several examples from the physical sciences, but surely there's no reason to assume that's the only place they're found. Maybe you can think of examples from your own experience with business management, time organization, playing a musical passage, or telling a story. A "trick question" doesn't have to be an academic exercise with a question mark after it. It can be *any* problem that's very easy to solve once you see the right way to approach it, and very difficult until you do.

And maybe some of them are a lot bigger than any of the types I've mentioned.

We hear a lot of lamentation these days about the urgency and seemingly insurmountable difficulties of such problems as eliminating the danger of nuclear war, ending hunger (which, be it noted, is far more a problem of distribution than of inadequate resources), and dealing with population growth, resource depletion, and technological unemployment. *How many of these are trick questions?*

Yes, they are problems of large scale and considerable complexity. But it still seems quite possible that the same situation can occur with them as with smaller-scale problems: that they may appear much less formidable and more tractable if viewed in just the right way than they seem if looked at in any other way. In the smaller examples I've mentioned, a problem which lent itself to a very easy solution could appear hopeless indefinitely if you insisted on looking at it from only one or two angles. Finding the "easy" solution required either enough luck to hit it on the first try—or enough persistence and flexibility to keep looking for new and very different approaches until one of them turned out to work.

Is it not possible that the Great Problems of the Day (this or any other) may seem so only because no one has yet thought to look at them from a perspective sufficiently different from the ones he's been brought up to regard as the "only" ones? Quite possibly that's *not* true of many of them. Most of the problems of real life, like most of those on a typical qualifier, are *not* trick questions. They simply require diligent (and often laborious) application of well established principles and methods. But for a real, first-class trick question, that's not enough. That kind you may not be able to do at all unless you see the right approach. And some questions *are* of that kind—maybe even some of the Big Ones.

This much, at least, seems clear. The problems of any time are, in a very real sense, a qualifying exam—for individual, society, or species. The reward for passing is the chance for a future (and a try at the next level of problems!).

And the ability to pass just may depend on the ability to recognize the trick questions—and to look at them from enough different perspectives to find the solutions that can be done. ■

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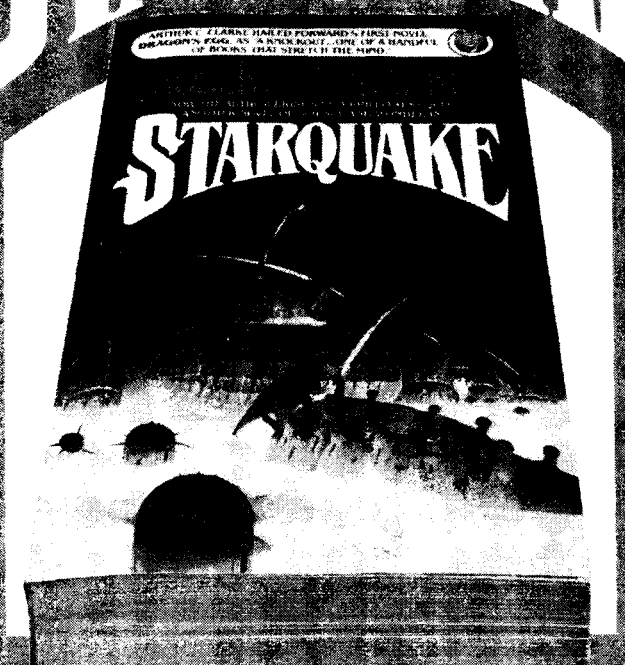
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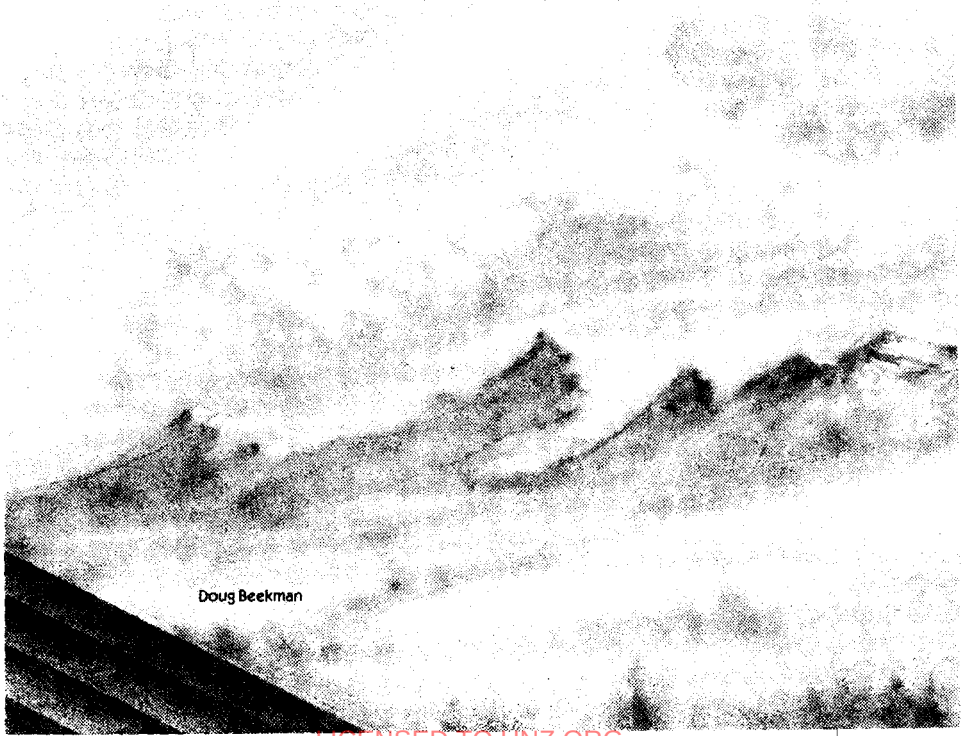

Doug Beekman

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Wanda Grigg stood at the back of the work platform, watching Jeff's flight. His hang glider was bright red and had a stylized yellow falcon. He reached the central updraft, and his dive became graceful soaring.

She was light-headed from more than the height and the heat. She could feel her heart racing, and she couldn't get enough air into her lungs. Splash Jeff anyway! Mom was right about boys being slow. He hadn't even noticed how she felt about him; he still thought of her as one of the gang. But she would change that tonight. The formal Mom had made her for the end-of-term dance would show him she was a girl.

He was spiraling down toward the park, and Lori had almost reached the top of the access belt. Time to fly. Wanda carried her hang glider and helmet to the edge of the platform.

Calgary Three was a ball a mile across. She stood halfway up the inside of the shell, with the plastic composite a clear wall at her back. Six hundred feet below she could see the farm and park that covered most of the ground level. Water vapor condensed on the shell, ran down, and became eight streams flowing to the central lake. There it was stored for various uses, but meanwhile people swam and fished in it.

The afternoon was cloudless and sunny outside the windrider. Calgary Three was sailing miles above bright blue Caribbean water sprinkled with green islands, on its way north for the summer. Two was a Christmas tree ornament, clear except for its black lower third, floating a few miles away. She couldn't see One or Four.

She checked the hang glider's frame and fabric, and made sure the belly strap was secure. Her orange flying outfit was an old outside suit that Mom had cut down to fit her. She wiped sweat from her forehead before putting on the bowl helmet. She was baking inside the thick insulated suit, but the Council had insisted that fliers wore protective clothing.

She had the control bar in her hands and was leaning forward when she was stopped by the weirdest sound she had ever heard. A crack like a stick breaking high overhead, but deeper and much louder. She looked up.

Near the top of the shell some solar panels were swaying.

A hole!

The emergency siren began shrieking. Tiny people on the ground level scurried in various directions.

She felt sick. The dance was the key to her strategy for winning Jeff; she had been making her plans for months. Her whole future happiness depended on it. And now this had to happen. Holes were the biggest possible deal, certainly big enough to cancel the dance. She was cursed.

Unless. Unless the hole was patched right away, before it could cause real trouble. But it would take the work crew *minutes* even to get there.

She knew what to do. The patching drill was one of the first things a windrider schoolchild learned, even though no one ever really expected to do it. She should have been following Lori down to their splashdown station. Instead she yanked the patch kit from its brackets, clipped it to her belt, and dove off the platform.

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She loved flying. Even now, with other things on her mind, she gloried in the swift motion, the rush of air over her body, the spectacular view, and above all the freedom. She went into a steep glide to escape the downdraft near the shell. The kit made her heavier than she was used to, and shifted her center of gravity. But after some experimenting she figured out the right compensation.

She sailed low and fast over the farm. The siren was muted by the wind, and she wasn't as hot now. Trees and crops were a dark green blur. She aimed for the lake and started to climb.

Fliers weren't allowed near the top of the shell because of the solar panels and other dangerous obstructions. But she had a good excuse. She soared higher and higher, until the ground level was a blue-rimmed circle. She was going to have a great story to tell Jeff at the dance.

Her eyes avoided the sun with practiced skill as she hunted for and found the hole. The updraft became a powerful air current flowing toward it.

She had never seen a real hole, just pictures in school. This one looked bigger than any of them. It wasn't a tear or fracture, but a round puncture over two feet across. She wondered what could have caused it.

She spotted the closest catwalk. The current was lifting her faster and faster. She was a good flier, but she had never tried such a tricky landing. She would have to do it just right.

A big plastic sheet embedded with solar cells hung near the hole, rocking violently on its tethers. The hole gaped wide like a mouth getting ready to swallow her. The hang glider was about to crash into it, in a howling storm wind, when she banked right as sharply as she could.

She had planned to get clear of the current and drop onto the catwalk. But the solar panel tipped the edge of the hang glider.

She tumbled.

She was too surprised to be afraid. The world went vague. Something hard hit her chest. She reached out instinctively, and wrapped her arms around a catwalk tether.

She hung on tightly. Catching her breath, she realized where she was and remembered not to look down.

She pulled herself onto the narrow catwalk. Unstrapping the hang glider, she clipped it to the handrail. It flapped in the current like a giant kite.

The warmer, lighter air inside was spilling into the colder, heavier air outside. The difference, created by the greenhouse effect and the plastic composite's insulation, kept the windrider aloft. Calgary Three was a super-pressure aerostat, a hot air balloon. With a leak in it.

She opened the kit. Patching plates were aluminum alloy squares with interlocking edges and stickum strips on one side. She assembled a three-by-three foot patch and clipped it to her belt, where it hung awkwardly.

The shell was inset with a pattern of work clamps. She took the two shoulder lines from the kit and clipped them to her suit. Then she leaned out, holding the handrail with one hand, and attached the other ends to the clamps next to the hole.

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She climbed over the handrail and jumped.

She had really liked this part during the exercises. But then there hadn't been a fierce wind. She dangled under the edge of the hole, rocking and bouncing worse than the solar panel, half deafened by the noise even through the helmet. The patch banged painfully against her leg.

The half-inch-thick edge was charred dark. Looking at it, she noticed something that was going to complicate the job.

The shell got the incredible strength it needed from a webbing of monomolecular strand cable. The more numerous one-sixteenth inch cables distributed the stress and weren't that important individually. But the quarter-inch cables were load bearing. If any of them broke, the windrider could tear itself apart. She had never heard of it happening. Yet two quarter inch stubs were whipping in the current at opposite sides of the hole.

She would have to fix that too, but the hole had to come first. There was only one way to do both quickly. From outside.

She had never been outside. She wished she could wipe the sweat from her forehead. She also wished the work crew would show up, but there wasn't any sign of them.

The current was trying to throw her up through the hole. She grabbed the edge and helped, doing a jungle gym curl.

She popped through feet-first.

The shoulder lines snapped taut, and the patch jammed edgewise in the hole. She slammed backwards onto the hard shell. Even through the suit she felt the cold anti-trade wind that was carrying Calgary northeast. She shook off dizziness from the thumping and looked around.

The sun was near the western horizon, reddened by blast debris in the atmosphere. The shell was glistening clean from a recent decon scrub, but everything inside was dimmed by the greenhouse tint. She felt like a giantess on her own private world.

The clamp pattern was duplicated on the outside. She got the belt lines from the kit, secured herself, then unclipped the shoulder lines.

Something started hissing inside her helmet. It startled her for a moment, then she realized the drop in pressure had triggered the air system. Mom had left the work gear in the suit for skydiving off of the high belts, and she was fussy about maintenance. Now Wanda was very glad it was there. Outside air was too cold and thin to be breathed.

She got into position to turn the patch. The current from the hole pushed against her head and arms. She would have to do this right the first time; the pressure and stickum would keep her from moving the patch.

She jerked it sideways, and yanked her hands clear as it slapped over the hole. She just missed losing fingers. The current died.

The patch covered the hole totally. She looked at the edge, then got smart and touched her helmet to the patch. No second hiss, no vibration.

She had patched the hole.

She would be a heroine tonight. Jeff would pay attention to her for sure.

Unless of course Calgary Three ripped

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open and splashed first. She had better take care of the sheared cable right away.

Repairing monomolecular strand cable took long and intricate splicing. But the kit had what was supposed to be a temporary alternative. She hoped it would work.

She pulled out a cutter and a coil of plastic tubing a bit wider than the cable. She snipped both ends of the tubing, shortening it to the right length and activating it. Then she forced the ends over the stubs until it was taut. Whatever had holed the shell had melted the cable; even through her gloves the stubs were still warm.

She pulled back quickly. Some kind of chemical reaction was going on inside the tubing, shrinking it. Water was condensing on it and turning into frost. In a handful of seconds it looked as rigid as a piece of pipe. She had no idea of the splice's tensile strength, but it was supposed to be enough.

Her job was done. Everything else could wait for the work crew. She should have waited for them too, but she had a lot of things to do before the dance. There was an access lock thirty yards down the shell. She unclipped one line to start the clamp-by-clamp crawl to the lock.

Either she hadn't attached the other line properly, or something was wrong with it. She never found out which. As she leaned on it, it gave.

She scrambled for traction, but the plastic composite was as slick as glass. She grabbed for clamps and missed. Faster and faster she slid down the increasing slope.

She had a moment to regret her stupidity and everything she was going to miss. Then she hit the rim of the lock head-first. The pain was followed instantly by nothingness.

Jack Grigg stood up to ease his creaking back, and used the bandana around his neck to wipe muddy sweat from his face. His shorts, T-shirt, and sandals were a typical windrider outfit; cold weather was never a problem inside.

He hated farming. But everyone did chores, even chief engineers. He reminded himself that it was good for his incipient middle-age spread. Squinting up enviously at the fliers, he recognized his daughter's bright orange hang glider as she waited on the work platform. He had given it to her for her last birthday.

The explosion high overhead made him forget all about pulling carrots.

The emergency siren blared. He started to run, stopped, and looked to make sure Wanda was coming down the belt. Linda was at home taking care of the baby; they were already at their station.

He saw Wanda dive from the platform. He yelled, "No!" to the gods who were more likely to hear him than she was. He yelled it again as she flew over the farm and started to soar. He had spotted the kit dangling from her belt.

He ached to stay there, holding her aloft with his will. But the hole was priority one. A big puncture judging from the sound, probably caused by a meteorite. Besides, he could do her more good from the bridge.

He ran. Everyone else was also running, toward the escalators. Their worried questions were drowned out by the

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siren. He was relieved to see no panic. It looked like a drill, fast but orderly.

He didn't have time for the escalators. He went straight to the E-drop hidden behind a hedge. The hatch was up, popped by the computer. He jumped feet-first into the vertical chute.

Curling into a fetal ball, he hit the airsack and was half swallowed in its slick softness. It dropped. Long seconds of almost free fall as he passed the public, commercial, and residential levels. Then even longer seconds of violent pneumatic braking. A hatch opened in the side of the chute, he stumbled out, and the hatch shut. Hissing air told him the airsack was on its way back to the top.

The engineering levels were gloomy compared to topside. He rode the main belt down, watching the activity increase as off-shift personnel reported, listening to the sounds of the outsized machinery like a doctor checking a heartbeat.

Jumping off at the bottom, between the blimp bay and the helium tanks, he pressed his right hand against an ident-screen next to a door. It opened. He all but dove down the short stairway to the bridge.

He had reached the belly of Calgary Three. The bridge was a circular room rimmed with consoles, screens, and displays. Nine chairs faced the consoles; seven of them were occupied by busy men and women. The floor was transparent, showing the ocean and islands far below.

"Glad you could make it," Edie Jackson snapped over her shoulder.

"I was playing farmer. Where do you want me?" He ranked her in terms of seniority, but it was her shift so she was the boss.

"Communications."

He filled the empty chair in front of the com console and strapped in. A quick glance around the bridge told him a lot of bad news. Too many red telltales, too much tension in the faces, and the Caribbean was closer than it should have been.

"Ninety-four percent at splashdown stations," John Grace reported as he slid into the last chair. Soon all of the six hundred and eighteen citizens would be working to save Calgary Three or awaiting their fate in the safest places. But what about Wanda? Where was she?

"Jack," Edie said, "I've set up a datalink to One. Keep an eye on it."

"Lift negative nine hundred and dropping!" Marilyn Shaeffer reported in a high strangled voice. "Pressure decrease deforming the shell to point eight two!"

"Feed every watt you can find to the heaters," Edie ordered. "Stand by to dump water through the trim system. What's going to redline first?"

"The shell! The meteorite sheared a primary cable—the computer says we'll start to rip in six minutes!"

Edie turned to Chris Fricken. "Where's the work crew?"

"Halfway up the belt. ETA three minutes."

"Close. Too bloody close."

"The belt won't lift them any—" Chris stopped to concentrate on her earphone. "Chief Hoy reports there's someone already working on the hole. She wants to know what's going on."

"That makes two of us."

"It . . . must be my fourteen-year-

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old daughter Wanda," Jack said hoarsely. He had been trying to say it since he sat down, but the larger disaster had gagged him. Now the two were tied together.

Instantly he was the center of attention. "Explain," Edie snapped.

"She was hang gliding off a work platform. Before I started down I saw her flying toward the hole with a patch kit. I . . . really didn't think she'd make it."

"I bloody well don't see how she did—that's rough air near the hole. Crazy idiot. She can't accomplish anything except getting herself hurt." Edie frowned at him. "Or can she?"

He didn't know. "She passed basic drills with top marks. And she's wearing Linda's old outside suit, fully equipped."

"Fully equi—you mean she has a radio?"

Stupid! "I think so. Let me get her channel from the computer." His fingers were typing frantically as he spoke.

"Chief Hoy reports Wanda has gone outside through the hole . . . she's trying to fit a patch—"

"Why outside?" John asked.

"So she can work on the cable after fitting the patch," Edie explained. "Shut up."

Chris slapped her armrests. "The patch is in place!"

"Airflow and pressure readings indicate shell integrity restored!" Marilyn reported. "But stress is up to point eight seven!"

Jack was listening instead of concentrating on typing, and fumbled the instruction. Growling something ugly under his breath, he corrected it.

"Chief Hoy is diverting her crew to lock twelve. ETA four minutes."

"Watch the tension reading on that cable," Edie told Marilyn.

Marilyn smiled venomously. "I know my job! I—it's moving! It's nominal! She did it!"

Pride fought the fear in Jack's heart as the bridge erupted in cheers.

"She's Linda Calhoun's daughter all right!" John shouted.

"Okay, everyone, calm down." Edie cut through the excited babble. "This isn't over yet. John, cancel the emergency alert. Marilyn, monitor the reinflation and watch that patch like a hawk. Dick, find us a wind to rejoin Calgary. I won't be too fussy about the heading, but we need more altitude before nightfall. Chris, full damage control drill."

Numbers were glowing on the screen in front of Jack. He started to switch on the radio, then remembered it wasn't his bridge. "Edie, I have Wanda's channel."

"Call her."

He was setting it up when Marilyn screamed, "Oh my god!" and pointed at the floor.

An orange dot fell past the shell, curving toward the ocean. A moment later it was gone.

Outside suit orange.

Chris's voice was like shattered glass. "Chief Hoy reports Wanda isn't on the shell."

Once Jack had crawled out from under an overturned tank with broken ribs and a punctured lung. This was worse. But she hadn't splashed yet! She had the suit's parapack, if she remembered to use it. If she *could* use it.

He slapped a switch and spoke crisply into his throat mike. "Wanda, this is your father. Listen to me—"

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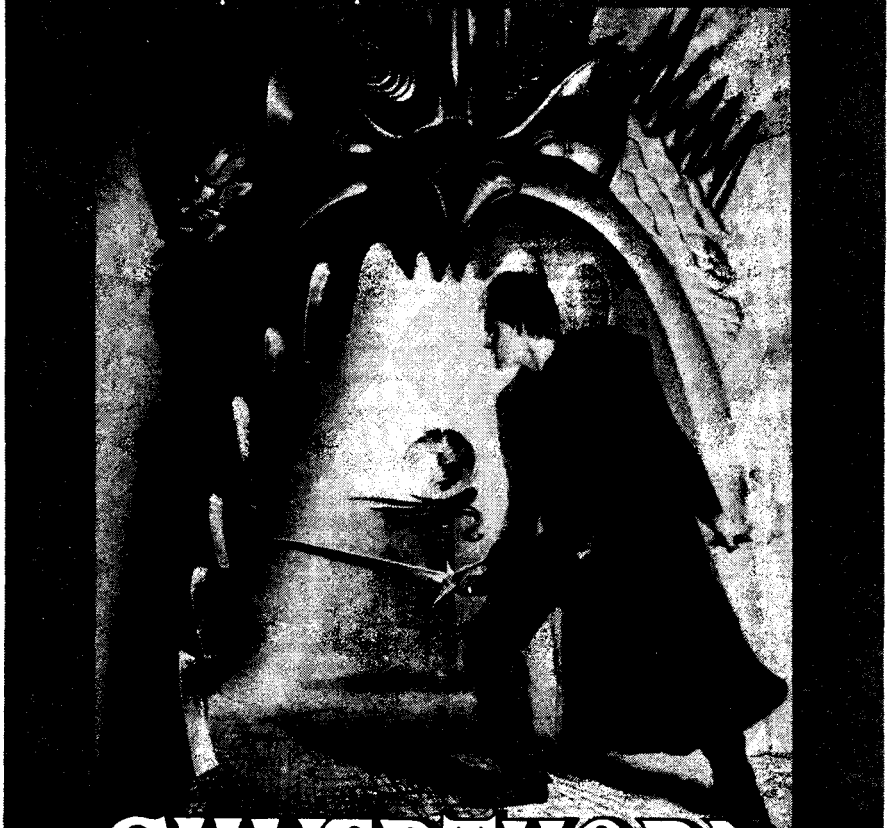

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* * *

Wanda hadn't had a floating dream in years, but she was having one now. A bad one. She spun out of control through a mosaic of scary images, and her head hurt.

"Wanda, this is your father. Listen to me. Don't be afraid. You aren't going to splash, but you have to do exactly what I tell you."

Dad's insistent voice pulled her out of the dream like a magnet. Her eyes blinked open.

For a moment she couldn't make any sense out of what was happening. Wheeling blues, a smear of red. Noisy wind battering her. Then it clicked. Freefall. She must have slid off the shell. How long had she been out? Not very; she was still falling.

"You have the parapack, Wanda. But don't use it yet. First you have to flatten out, or you'll tangle your lines."

She knew that. But it was good to have Dad with her, even by radio. She found the transmit switch and said, "I hear you, Dad! I'm okay!"

He ignored her and repeated his words. She remembered the suit radio was designed for shell work; it had a very limited range. She could hear him, but he couldn't hear her.

She had only gone skydiving a few times, but Mom had taught her all about it. She curled and uncurled. The world's spinning slowed, then stopped. She held herself spread-eagled against the rising wind. Her helmet had survived the banging better than she had. She wished she had something to take for her headache, dizziness, and pukey stomach.

"Easy does it, Wanda. There's no hurry. You're still a long way from the water."

It looked closer than it had from the shell. Glancing quickly over her shoulder, she couldn't find Calgary Three. She unclipped the patch kit and pushed it away. Then she yanked the ripcord.

The paraglider unfolded from the suit's flat backpack, snapping its lines taut. A helium cartridge inflated it and was ejected. The shock was distributed by the suit; even so it felt like she had been slapped by an angry goddess.

She was flying. The paraglider was a bright yellow wing over her, its airfoil design adding to the helium's lift. Her dive curved into a fast shallow glide. The control lines were harder to work than her hang glider's bar, but she could handle them.

"Well done, Wanda. Very well done. We have your paraglider on radar. You're three miles below us and a half-mile southwest. Fly northeast while we arrange to pick you up."

She banked until the setting sun was over her left shoulder. Now that everything was under control she began to enjoy this incredible, unending flight. The heating system was making the suit nice and cozy. Dad would get her home.

She sailed happily between the ocean and the sky.

The bridge was a three-ring circus. Chris was supervising the damage control work as well as the routine operations. Linda Calhoun was seated at the communications console, calmly advising her daughter on the fine points of paragliding. Jack and Edie were arguing in low voices at the weather console.

"A pickup is absolutely out of the

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question," Edie snapped. "The safety of Calgary Three has to come first—*you*'d be telling *me* that if it were your shift."

"You can't just abandon her!"

"A minimum five hours to inflate the blimp. By the time you got there, you'd be too bloody late. Low-level night operations are dangerous. I can't justify risking the crew and blimp on a hopeless rescue."

"It's not hopeless! She can land and float on the paraglider."

Edie pointed to the radiation map. "This close to Cuba the killzone is like walking into a blast crater."

"The outside suit will protect her—" His words trailed off.

"Not enough. Even if she doesn't drown or become shark food, you'd just be bringing her back here to die. I'm sorry."

He took a deep breath to calm down. Edie was blunt, but she was also right. He was too good an engineer to keep butting his head against facts. He had to find another way to save Wanda. She was out there, alone and afraid, waiting for him.

His eyes wandered over the screens and displays which furnished data so vital to windriders. The weather satellites had been destroyed in the war, but instrument readings from hundreds of windriders and zeps around the world were analyzed and shared by WeatherNet computers.

Hundreds of—

"Other traffic!" he almost shouted. "This is a well-traveled corridor. Maybe there's someone nearby who can help."

"Right," Edie said as she slid into her chair and typed quickly. He watched over her shoulder.

Flight plans rolled across a screen. Windriders he ignored; they had to stay in the upper troposphere to maintain their lift. But there were other birds aloft.

"That one," he said in the same instant she froze the screen.

"Could be." Edie turned to her com board and began entering a call code.

Captain Miguel Ramirez sat back in his chair and smiled. He was a happy man.

The war's fallout, toxins, and biowarfare viruses had almost rendered the world uninhabitable for humanity. It had survived by moving in opposite directions, the underground industrial enclaves and the migratory scavenging windriders. He considered the former claustrophobic and the latter dull. So he had become a zepman.

He looked down through the car's floor and admired the red sunset slashing across the ocean. *Mayan Princess* was the newest of Pemex Under's cargo dirigibles; 1200 feet long, 35 million cubic feet, with a top speed of 65 MPH and a crew of eight. It was enroute to the mid-Atlantic, where it would trade supplies to the Tivoli windriders for diamonds, metals, and other salvage from the ruins of South Africa. It had left Pemex Under that morning, delayed by the launching of a new windrider built for Brazilia.

"Hey, great hawk of the sky, we're getting a radio call." Pilot Second Elena Guzman kept her attention on the helm displays as she spoke.

"I treat you so nicely because of your soulful eyes, and what do I get? Insolence." He yawned. "Well, don't keep

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your captain in suspense. Is it Operations?"

"Wrong guess. It's windrider Calgary Three. Are you here?"

"Of course. Who else should I trust with an official communication? You, who talks so disrespectfully to her captain?" He punched a button on his console and put on his throat mike. "Captain Ramirez of *Mayan Princess* here," he said in English. "To whom do I have the honor of speaking?"

"Chief Engineer Jackson here. We have an emergency situation, and we hope you can help us."

"Of course we will do whatever we can. Please elaborate."

"A fourteen year old girl has fallen overboard. She's wearing an outside suit and is using the paraglider. Her position is forty-five miles north of you, at 4,300 feet. Are you willing to try a pickup?"

He should have contacted Operations for instructions. But he was the captain. An unfortunate child was in deadly danger, and he didn't need a desk-bound bureaucrat to tell him what to do. "We will attempt it." He gestured to Elena, who began setting up the course correction. "But we cannot hope to rendezvous in less than fifty minutes. Can she stay above the killzone until we arrive?"

The pause was a long one, long enough for him to wonder how he could pluck a paraglider out of midair. "We have radio contact with her. We'll guide her to the following coordinates—" Elena fed them to the computer as they came from the speaker. "She should be able to stay aloft there."

He checked the coordinates on his map screen and whistled. He saw what this Jackson woman had in mind. It might work, but if it didn't . . . it was not how he would wish to die.

"We understand," he said briskly. "We are proceeding to the rendezvous point at maximum speed. We will keep you informed of our progress. Out."

"Thank you. Our prayers are with you. Out."

He sounded the general alert siren, crossed himself, and scanned the weather board.

As soon as she ended the call Edie turned to Linda. "*Mayan Princess* is going to try a pickup. ETA at rendezvous is fifty minutes."

Linda switched off her mike, then said, "She's too low. She's already in the amber zone."

"She needs a thermal she can use to climb. WeatherNet only shows one close enough. I'm feeding the coordinates to your station—you'll have to talk Wanda through it. Can do?"

"Can do."

Jack looked over Edie's shoulder at her map screen, to see where those coordinates were. "Cuba!" he choked. "That's insane. You're killing her for sure."

There weren't any bugs or nerve gases on Cuba; they hadn't been needed after the saturation nuking. It was the hottest part of North America outside the United States.

"Just off the coast, actually." Edie focused a lased glare on him. "The different cooling rates of the land and ocean create an updraft."

"Lifting the killzone to Wanda's altitude."

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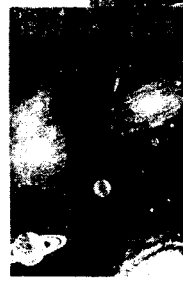

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"She can climb above it. She has to."

"And if she can't? She's only fourteen years old."

"Calm down, dear," Linda said gently. "We have to try. It's her best chance." She switched her mike back on and spoke in a low confident voice.

The sun was almost gone now. In the last of the day's light Wanda looked down at the ocean and land, much closer than she had ever seen either before. The water was dark except for the lighter crests of the waves. The way they formed one after another and ran to the coast fascinated her. The island—Cuba, Mom called it—started as an irregular outline of beaches and rock outcrops, then became rolling terrain. There were few trees but lots of smaller vegetation, except for the big round patches of red dirt and ruins.

"Your altitude is good, dear," Mom's voice said in her ear. "Get ready to bank right . . . now. Not too sharply. That's good, dear. You're still in the updraft."

Where the bombs hadn't fallen, time was slowly crumbling roads and towns and bringing back what had been there before. Even the bare patches were turning green at the edges. Dad was right. Nature was healing the world. In a few hundred years, when the radiation and the poisons and the bugs were gone, people would be able to live there again.

But why would anyone want to give up the freedom of the sky? She never would.

"Captain Ramirez is less than ten minutes away. He has you on his radar. He'll be talking to you soon about picking you up—do whatever he tells you, dear."

She was glad to hear that. She had been flying for a long time, and it was getting very uncomfortable. Her head still hurt. She was hungry and thirsty. Her arms and legs ached; working the lines had become a hard job. And she didn't like the idea of flying in the dark. She wanted to be home.

"We're all very proud of how you patched the hole. The work crew chief said you did it perfectly. The permanent repairs are being made, and everything is back to normal. Mayor Keith is going to give you a medal at the next Council meeting."

The suit was still keeping her warm, and the wind was a familiar noisy pressure. All in all it had been a wonderful flight. First the endless glide, then the soaring maneuvers in the updraft. She had even seen gulls.

"You'll be home soon, dear. I'm cooking barbequed chicken for dinner, and I didn't forget your extra wings. Your altitude is good. Get ready for another right bank—"

She wished Captain Ramirez would hurry up. Even with Mom's help it would take *hours* to dress and primp, and the dance started at eight. After all she had gone through for Jeff she was *not* going to blow it now.

Miguel paused halfway up the access ladder to catch his breath. The outside suit made climbing strenuous. He had already put on his helmet; the gap between ballonets held too much hydrogen and too little oxygen for healthy breathing. He was hot, sweaty, and itchy, and the difficult work still awaited him.

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He had figured out a way to retrieve the poor child. He wished he had been able to come up with a better one.

"ETA six minutes," Elena reported over his suit radio. "Airspeed down to 30 MPH."

"Keep us into the wind, my pretty pilot. If it shifts tell me *before* you maneuver." He started climbing again.

"Aye aye. The wind is holding at twelve MPH out of the northeast, with light turbulence."

"Hold us in the smooth groove, so your captain can write nice things in your personnel record."

"Aye aye," she said seriously.

"Don't worry, Elena. I'll catch her."

At the top of the ladder he opened the hatch. The evening sky was very dark blue, and the wind howled like the wolves of legend. He clipped his safety line to the nearest hull clamp; most of the line was on a locked reel hanging from his belt. He climbed out.

Mayan Princess was shaped like a stepped-on cigar. The upper hull was a field of white plastic big enough for several football matches. The rudders and elevators were astern, while the twelve motor gondolas were side-mounted. Rows of solar panels were set flush with the hull.

He stood up carefully, leaning into the wind. His traction boots gave him good footing on the slick plastic. He felt like the old god, the feathered serpent, flying over the world. It would be a poetic way to die.

"ETA two minutes," Elena reported. "Airspeed down to twelve MPH and holding steady. I have Wanda on the radio. Shall I patch you through?"

"Yes. And keep Calgary Three informed."

"Aye aye."

He peered into the gathering darkness ahead. "Wanda, this is Miguel calling from *Mayan Princess*. Can you hear me?"

"I sure can. Are you going to take me home?"

She sounded tired but in control. Good. "Absolutely, my dear. Trust me. You'll be sleeping in your own bed tonight, but you have to help me a bit."

"Mom told me to do whatever you say."

"Look southwest and down. Can you see our running lights?"

A pause. "I see two red and yellow rows."

"That's us. Now listen closely, my dear. You'll have to come to us, since you're more maneuverable. Okay?"

"Sure, no problem. Your zep's back is a lot bigger than the lawn I usually land on."

He could see her paraglider, a dark blotch getting bigger fast.

"Don't come straight in," he said, keeping the worry out of his voice. "At our combined speeds you'd slide off."

"Of course, I know better than that." She sounded faintly exasperated. "I'll make a close pass and cut 180° to match your course. Nothing to it."

For a moment he was speechless. Then he said, "Just what I had in mind, my dear. You'll see me standing on the hull. Land as close to me as you can, release the glider, and *lie flat*. The hull is slippery. I'll come get you. Okay?"

"Sure. I'll be right down."

The blotch became an inflated wing. It sailed over him about a hundred yards

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to starboard, and started banking near the tail. His imagination raced ahead; he saw the child sliding off the hull, over and down . . .

She came around beautifully, less than fifty feet above the hull, and glided down the center line as if he had drawn it in a 3D tank. Maybe a little high.

And definitely too fast.

He was about to yell, "Shear off!" when he realized what she was doing. The words froze.

She came right down his throat. He ducked, but she didn't hit him. At the last possible moment she stalled hard and yanked the release ring.

Relieved of her weight, the wing shot up and back. A short slender figure wearing an orange outside suit dropped lightly onto the hull two feet in front of him.

"How was that?" she asked in a self-satisfied voice.

He wrapped his arms around her and laughed wildly.

"What's the matter?"

It was several seconds before he could answer. "By heaven, you remind me of me! Shall we step inside, my dear? By the time we get out of decon we'll be well on our way to Calgary Three."

"Thanks. I really appreciate your help. Mom is waiting dinner, and there's a big dance tonight."

He was pleased that his arms didn't tremble as he lowered her through the hatchway.

Mayan Princess was tethered to the underside of Calgary Three by the windrider's boarding tube. Wanda and Miguel were sharing a cramped pneumatic capsule as it was coaxed to the top.

She didn't mind. Miguel was old, of course—almost thirty. But his slim waist, mustache, and laughing eyes made him a real heartblaster. In his black and silver company dress uniform he looked almost regal. She was thinking how he could be a big help in her Jeff campaign.

The capsule opened. They stepped into Calgary Three's blimp bay.

Suddenly she was surrounded by Mom and Dad, being hugged within an inch of her life. They were both talking too fast to be understood. Dad was gravel-voiced, and she would have thought Mom had been crying if that weren't inconceivable. It was embarrassing. The last thing she wanted was for Miguel to see them treating her like a child.

But it did feel good to be home.

Finally Mom and Dad went over to Miguel. After the introductions Dad said, "There's no way we can tell you how grateful we are. We owe you a very large one."

"We wouldn't insult you by offering you payment," Mom added. "But we have gifts of food and wine for you and your crew, and we wish to replace what the pickup drained from your power cells."

"You are most gracious," he said as he bowed. "Although the pleasure of meeting your daughter is all the reward one could possibly desire."

"The recharging will take some time," Dad said. "Meanwhile you'd honor us by joining us for dinner. After we put Wanda to bed—"

She felt like she had been hit in the stomach. "Mom! No!"

"What's the matter, dear?"

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"The dance! I'm going to the dance tonight!"

Mom looked surprised. "But . . . after everything you've been through . . . you need to rest."

"I took a nap in the zep. And the medic said I'm okay. Please!"

Mom stared at Dad, who stared back and shrugged helplessly.

The apple trees around the park Quad were laden with fragrant blossoms. Colored spots roved the dance floor. The theme was A Tropical Paradise; leis and shells were strung everywhere. The band was playing loud zock music, while half a hundred teenagers were busy enjoying themselves. The night was a starry canopy.

The tiny ring of work lights near the top of the shell was ignored; the faint noises were overwhelmed by the music.

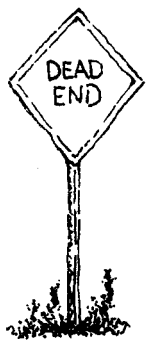
Wanda paused between the totem poles that led into the Quad. She didn't mind being late, since she wanted to make an Entrance. The mirror in her room had revealed an elegant young lady with honey blond hair done up, wearing an off-the-shoulder pink organza dress, a white stole, and Mom's locket. But would the world share her enthusiasm? Would Jeff?

"How do I look?" she asked nervously

"So lovely that my eyes can hardly bear the radiance," Miguel assured her. He offered her his arm. "Shall we, my dear?"

"Let's." She took it, and together they walked into the dance. ■

Life in the fast food lane.



It can be a slow death if you're loading up on high-cholesterol, high-fat foods that may eventually choke your arteries and damage your heart. If you're a teenager, slow down on fast food that's high in fat. Chances are it'll catch up with you someday if you don't.

American Heart Association

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George W. Harper

A LITTLE MORE POLLUTION, PLEASE!

Before throwing anything out, it's a good idea to make sure you don't need it. Could this be such a case?

It is recorded that during the waning days of the last century, a modestly prominent middle-aged astronomer had to be pulled from atop a venerable geologist who obstinately persisted in arguing that geological evidence proved the Earth must be at least 300 million years old. Astronomy had already established that the sun could not possibly have flamed more than 75 million years and for an obviously senile septuagenarian geologist to maintain a contrary opinion was an intolerable affront to the primacy of astronomers everywhere. To question an astronomer's professional opinion was heresy!

Modern astronomers are somewhat less violent but frequently no less complacent of their wisdom. Thus we find a recent diktat which ordains that if the human species does not promptly desist from spewing heat and particulate pollutants into the atmosphere the mean world temperature will rise about 9 degrees over the next century, melting the polar icecaps and flooding cities all over the world.

Just how we are to accomplish this in the face of colder winters and a rising human population is nowhere specified . . . a little genetic engineering so

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we all grow fur coats, perhaps . . . but the warning hardly qualifies as startling. In recent years a number of highly respected astronomers have pointed to Venus and gone on record warning us of the hazards of a runaway greenhouse effect where the buildup of atmospheric CO_2 traps heat from the sun and makes the world uninhabitable. The 9-degree prediction is simply an extension and refinement of the greenhouse warnings which focus primarily on the release of human-produced heat into the atmosphere. Both the long- and short-term perils are part of the pollution syndrome which has become so popular over the past few years.

Mention pollution to just about anyone and we are assured of the knee-jerk reaction: "Pollution! Ugh, that's awful. We've got to stop it before it kills everyone!" Pause to think a bit about this response and its pavlovian character starts to become disturbing. Anything capable of evoking so automatic a reaction is also susceptible of being misused . . . which recalls the remark by one of our more illiterate TV commentators who, a few years ago, scornfully pointed out that in leaving excess equipment behind on the Moon we were "now no longer content merely with polluting the Earth but have started polluting the entire universe with our litter!" It is amazing how minuscule the universe becomes when challenged by a news commentator. It is on a par with the remark by another commentator who opined that "Now that we've conquered space its time we turned our efforts to solving the problems here at home!"

Continuing in the same vein, anyone who wishes to liven up a dull party might try dropping a quiet comment that a little radiation is good for us. This is positively guaranteed to lead to a screeching confrontation by three or four individuals who are utterly convinced that radiation means death. "Radiation is pure pollution! Any amount is too much!" Try to explain that without nuclear radiation from the sun life becomes impossible on Earth and they gasp, struggle briefly with an alien concept and dismiss it as something wholly irrelevant. Observe that in burying spent nuclear waste we actually are returning less radioactive material to the ground than was originally taken out and they stare blankly. They are so caught up in their fantasy of pollution they cannot grasp the elemental idea that when we extract energy from something we necessarily wind up with less energy than we started with. We may increase short-term radiation, but no matter how we want to cut it the sum total of radiational waste is less than was initially extracted. Sorry about that, but it's the truth.

Sadly, none of this makes any real difference. The word "pollution," as society currently uses it, has become virtually meaningless. It is now primarily a pejorative to describe anything the speaker dislikes. If you don't like dogs, then call their leavings "pollution" and run them out of town. If you dislike humans, call our waste "pollution" and demand we stop breathing. Dislike rock music? You shout "noise pollution" and call for its elimination. Not long ago, authorities of a Pacific

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coast community actively considered fencing off several hundred square miles around a mountain reservoir and killing off the animal life to prevent "pollution!" That this would produce an ecological catastrophe was not even considered. "Pollution" has become a buzz-word so broad in content, it now has at best only marginal significance. It has been polluted by pollution-criers!

As we see it, there are so-called "pollutants" that it's highly desirable or essential to eliminate from the environment. There are other "pollutants" which are iffy and probably should be reduced in the environment and, at least in the case of "air pollution" there is one which, if we successfully eradicate it . . . or even reduce it significantly . . . conceivably might lead to global catastrophe and possibly to the effective destruction of the human species!

We suspect even the chaps who today scream most shrilly about the need to eliminate air "pollution" would be a trifle disconcerted if they had to do their yelling from the bottom of a mile-thick ice sheet. It would be ironic justice, but the rest of us would have to suffer, too. And this is not so nice. It is entirely possible that a significant reduction in the air "pollution" index will lead directly and very quickly to a new glacial age which would smother our cities and farmlands under a massive sheet of ice.

Does this mean we question the possibility of a greenhouse effect? Are we flying in the face of observational evidence and denying its reality? Not in the least. Venus exists, so does greenhousing. But we take exception to the facile presumption that these facts are directly tranferable from Venus to Earth. Venus lacks water. Earth obviously does not. Venus is only 70 percent Earth's distance from the sun, which means it receives roughly twice as much heat per square cm. of surface as Earth. Earth, with its massive oceans, has evaporation and a build-up of atmospheric moisture in the form of clouds will reflect solar heat rather than absorbing it, thus largely neutralizing the effects of any man-made heat or CO_2 excess that may be present. In short, while it is theoretically possible that an excessive buildup of carbon dioxide in the atmosphere could trap enough heat to melt the polar ice caps and flood coastal areas around the world, we doubt as a practical matter whether there is a realistic likelihood of creating a Venus effect.

But suppose we postulate the possibility of greenhousing on Earth, just to see where it leads us. We burn fuel to warm our homes and run our transportation systems and factories. The fuel burned (except for hydrogen, nuclear, and fuel cell systems) releases CO_2 into the atmosphere, which leads to a buildup of heat which in turn leads to a general melting of ice caps and a dramatic increase in the percentage of Earth's surface water cover . . . melting the ice caps would add roughly 10 percent to the existing land-to-water ratio, all of it in the form of shallow, evaporatively efficient tidewaters. The same heat that leads to the melting of polar ice caps also tends to increase evaporation and creates dense cloud layers which reduce

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the intensity of the solar radiation by reflection.

With the generally warmer temperature we need no longer use so much energy heating our homes, so the rate of CO_2 release into the atmosphere slows. In the meanwhile, the shallow tidewaters become prime breeding ground for vast quantities of algae which absorb CO_2 and release oxygen. Oceanic CO_2 absorption completes the picture and conditions stabilize, probably well short of a complete ice melt. The overall effect is a partial melt of the ice caps and some flooding of coastal areas around the world. But there is no Venus effect, and while the consequences may be rather uncomfortable, the human race would survive. We might have ourselves a steamy, carboniferous era climate where glimpses of the sun are rare and torrential rains sheet down daily, but the Venus effect per se does not occur.

Now suppose we look at some of the possible hazards of a significant reduction in air pollution. Astronomers may point to Venus, but geologists can point to Earth. Over the last several million years our planet has endured a whole succession of ice ages, where mile-thick glaciers perched atop what is now Chicago, when what is now Miami was 100 miles inland, the Gulf Stream flowed eastward south of Cuba, and icebergs ground against the Bahamas peninsula and clogged the California coast.

The last five ice-ages appear to have come at approximately half-million year intervals with the time between the end of one age and the onset of the next roughly 25,000 years. A look at the calendar therefore suggests we are about 10,000 years overdue for our next ice age! More pertinently, a study of Earth's climatic history over the past 7,000 years argues that we may actually have entered a new ice age around 6,500 years ago, but for some reason it was aborted.

The evidence is moderately convincing. Roughly 6,500 years ago, Earth's climate was halcyon. The snow line in Scandinavia was above the 8,000 foot level in many areas. Deciduous trees grew all the way to the arctic circle. The Sahara Desert region received adequate rainfall and the peoples of the Badarian culture roamed throughout the Saharan grasslands. The evidence for all this is decisive. Badarian artifacts are found strewn over areas where no rain has fallen in centuries. Satellites photographing the African desert have revealed the beds of several former rivers, all of which save the Nile had dried up by about 6,000 years ago.

By 3,500 years ago, the tree line in Scandinavia had dropped to around 6,000 feet and deciduous trees were in full retreat from the circle. Climate throughout the world was changing. Temperatures had started cooling and the snow lines on northern mountains crept lower every year. Growing seasons in Europe were shortening and the winters even in Italy and Greece became a little more severe with every passing season. The fertile lands of Samarkand cooled and dried and it became a desert.

A little less than 2,000 years ago the rains along the northern coast of Africa

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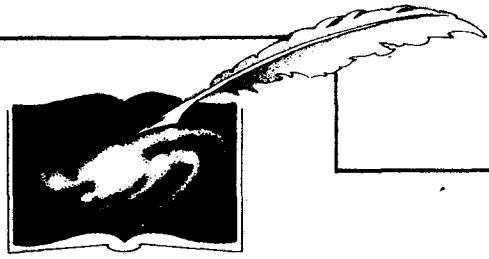

About L. RON HUBBARD's

Writers of the Future Contest

by Algis Budrys

The Writers of the Future contest substantially rewards at least twelve talented new speculative fiction writers each year. With no strings, every three months it confers prizes of $500, $750 and $1,000 for short stories or novelettes. In addition, there's an annual Master Prize of $4,000. All awards are symbolized by trophies or framed certificates, so there's something for the mantelpiece too.

There's also a Writers of the Future anthology, which I edit. (There was one last year, and there's another one just out as you read this.) It offers top rates for limited rights in the stories. These payments are in addition to any contest winnings. The anthology is distributed through top paperback book retailers everywhere, and is kept in print and on sale continually. All that's required to win or to be a finalist is a good new story, any kind of fantasy or science fiction, no more than 17,000 words long, by writers whose published fiction has been no more than three short stories or one novelette. Entry is free.

The contest deadlines in 1986 are March 31, June 30, and September 30, and there are First, Second and Third prizes for each three-month quarter. At the end of our year, a separate panel of judges awards a Master Prize to the best of the four quarterly winners. So one person will win a total of $5,000. Judging panels include or have included Gregory Benford, Stephen Goldin, Frank Herbert, Anne McCaffrey, C.L. Moore, Larry Niven, Frederik Pohl, Robert Silverberg, Theodore Sturgeon, Jack Williamson, Gene Wolfe and Roger Zelazny, as well as me. Matters are administered so that the judges are totally independent and have the final say.

It seems hardly necessary to embellish the above facts with any enthusiastic adjectives. This contest was created and sponsored by L. Ron Hubbard and the project will continue in 1986 and try to do some realistic good for people whose talent earns them this consideration. For complete entry rules, and answers to any questions you might have, write to the address given below:

Don't Delay! Send Your Entry To:

Writers of the Future Contest
2210 Wilshire Blvd., Suite 343
Santa Monica, CA 90403

Or, you can find the rules—and examples of winning stories, plus informative essays by some of the judges—in either of the Writers of the Future anthologies. They're original paperbacks and cost $3.95 each.

Good luck.

—Algis Budrys

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largely ceased, so today the erstwhile "breadbasket" of the Roman Empire is hard put to provide food for its own population, and is mainly desert. At the same time this was happening in Europe and Africa, the winters in central Asia had deteriorated to a point where hordes of nomad herdsmen from Siberia, made desperate by lack of food, erupted onto neighboring lands with sullen ferocity and a single-minded determination to survive. The refugees driven from their homes by the northern invaders migrated into Europe where they became known as Huns, Avars, Vandals, etc., and promptly toppled the Roman Empire. Since the victors against Rome were the LOSERS of the battle for the Asian steppes, we can imagine the calamity that would have befallen Europe had the victors continued their pursuit!

Only a couple of centuries after the Huns and Vandals, the advancing cold made it no longer possible for Scandinavia to support its population. New waves of migration led to the Vikings and their conquests of Normandy, England, and Sicily and their discovery and settlement of Iceland and Greenland.

Thermal "pollution" from its volcanoes and geysers kept Iceland habitable, but the Greenland settlers had no such luck. The colony got off to a promising start and several settlements were established. A bishopric was created and the population grew to three or four thousand. But nothing could stop the ice. Each year grew a little colder. Every year the growing season was a bit shorter. Every year the ice sheet encroached farther onto the pastures and fields. Massive icebergs began clogging the ocean and prevented ships from stopping by. Greenland vanished from the European horizon for over 150 years. When the next ship arrived, there was no one there to greet it. The last survivors had died over a century earlier and in most places the snow and ice completely covered their old farmsteads.

Less than a thousand years ago, the cold was whistling down on the heartland of Europe. The Seine River froze solid in Paris, and wolves howled in the streets of the city as they fought the Parisians over the bodies of the dead. Ice formed regularly on the canals of Venice, and Rome experienced a succession of bitterly cold winters. Significantly, this same period saw the destruction of the Anasazi culture in the American southwest. This has already been associated with a prolonged drought and a succession of abnormally frigid winters, so we can be reasonably certain we are dealing with a worldwide phenomenon rather than a localized aberration.

But this was to prove the high-ice mark. Around 1200 A.D. the weather began reversing itself, slowly at first then with increasing speed as Earth experienced a new warming trend which has lasted some seven centuries and only around 1950 started showing signs of turning cold once more.

There are several ways of accounting for this trend. Since knowledge of the fine detail of glaciation periods is scanty, we might call it a perfectly normal part of the glacial process; a preliminary

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cooling which lasts about 5,000 years followed by a respite of perhaps 700 years before going into a second cooling era with other brief interludes to follow. This is undoubtedly a legitimate way of interpreting the evidence. If correct, we may assume Earth is in for a new cooling spell which will outdo the last and humankind is in for some very nasty climate over the coming millennia.

A second way of accounting for the warming trend is more interesting. When the last glacial age started half a million years ago, man was something of a newcomer on the scene. The human (or proto-human) population was probably no more than a few million, with the majority still living in semitropical regions. When the glaciers moved south, those of our ancestors who were confronted by the advancing ice retreated before it. A few campfires were lit, but that was the limit of human response.

In contrast to the last ice age, by the year 1200 A.D. the human population of Earth probably stood at roughly 500 million, with the majority living in the northern hemisphere. Property and real estate rights were established institutions, something to be defended to the bitter end. A farmer does not desert his family plot without compelling reasons, and cities such as Rome, Athens, Paris, London, or even Moscow are not lightly abandoned. When cold comes you light a fire and tough it out. If it gets colder you add another log and continue to sit tight. By 1200 A.D. the Earth's cooling trend was countered by the smoke from millions of fireplaces, all belching heat, carbon dioxide, and soot into the atmosphere. Cold "pollution" was met by heat, soot, and CO_2 "pollution." The cold lost and Earth gained a respite.

Which of the two alternative explanations is correct; or are perhaps both correct, with a natural respite being further augmented by human-caused air pollution? We lack the data to permit an absolute conclusion—partly because no one has looked for it—but there are some fascinating elements to consider.

Earth's weather is narrowly balanced between extremes, and a change of three or four degrees in the mean world temperature is enough to start an ice age, or end one. This is known data. We also know that even small cities spew enough heat into the air to create micro-climates overhead. It is the same principle as that used by Florida citrus growers when a freeze looms. Smudge pots cannot cope with heavy frosts but they are quite capable of muting the effects of a modest one. Of special significance is the fact that we do not get the same effect if we merely deploy a batch of electric heaters. "Pollution," or smog, emitted by the smudge pots is essential if the remedy is to work. It creates an artificial cloud of sooty smoke which reflects the heat back and contains it over the citrus grove. Without the smudge the heat simply radiates off into space and is quickly dissipated. With the smudge, the same units of heat energy are multiply reflected and confined.

By clear implication, the medieval cities, small though they were by comparison with modern metropolitan areas, were still significant in creating islands of resistance to the cold and thus in

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modifying the prevailing weather patterns. As the population increased and more smokestacks belched out their "pollution" the climate was further eased. This effect MUST occur regardless of any natural slaking of the cold. In short, even if the recession of the mini ice-age was a natural consequence of the pattern of ice ages, we can still be certain that it was further ameliorated by human action. The only question is whether human activity is sufficient in itself to account for the reversal of the cold.

Here again is uncertainty. We lack the data to come up with an unambiguous answer. But the last half-century has provided some disturbing evidence. The British Isles are a good place to begin. For centuries London has been famed for its impenetrable fogs which swath the city for days on end during winter months. Starting around 1950 the English began switching from sooty coal pots to electricity for heating. Much of this power comes from clean nuclear sources, the rest from emission-efficient central generating systems. By 1960 the English countryside had become mostly soot-free and the notorious London fogs were largely a memory. But so were the warm, rainy winters which used to characterize the British climate. Instead the air is clear, the ground heat quickly dissipates into space, and temperatures have become abnormally cold with heavy winter snows commonplace.

France too is feeling the effects of a newly "pollution-reduced" environment. Clean, centralized energy has lowered air pollution and dropped temperatures. In the winter of 1984-85 a blizzard swept down on the Riviera and a number of campers froze to death on the Mediterranean coast—which is roughly equivalent to a snowstorm blanketing Honolulu! It is not something that just happens.

Paralleling the deepening cold in Europe is drought in Africa and elsewhere around the world. Lack of rain has led to a systematic southward march of the Sahara, commencing around the late 1950s and continuing uninterruptedly every year since. Then there is the succession of disappointing harvests which have afflicted the Soviet Union. Our propagandists cheerfully attribute the failures to inherent defects in the Soviet system, but while this may be a contributing factor the primary cause has been a steady worsening of the weather and frequent droughts over the past three decades.

This too may be connected with a reduction in suspended air particulates and atmospheric CO_2. Water droplets form most readily when aquaphilic "pollutants" such as soot particles are adrift in the atmosphere to serve as condensation nuclei . . . witness the occasional successes of rainmakers seeding clouds with silver-iodide crystals. It is therefore entirely possible that in our obsessive urge to eliminate air "pollution" we may have been the direct cause of the drought-induced famines now killing tens of millions of people throughout the world!

Nor has the United States been immune. As we have cleaned up our air, the climate has worsened. We may have

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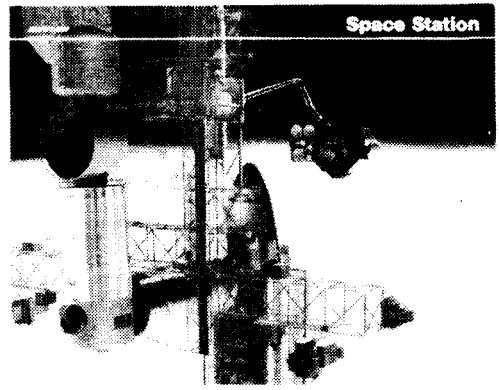

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made southern California marginally more endurable, but on the other side of the coin we find massive winter freezes devastating the fruit crops of Florida, whole successions of hurricanes lashing the eastern and southern seaboards, and droughts, abnormal freezes, heat waves, and floods pestering the Midwest. Every year for the past decade has seen new records for cold being set in the southlands. When Atlanta gets nearly a week of zero weather —as it did during the winter of 1984-85—we have to call it unusual. Winter snows all over the nation have been getting heavier every year for the past decade, and the proportionality between precipitation in the form of rain and precipitation in the form of snow has been edging in the direction of snow. Keep at it a little longer and the whole nation may find itself in deep trouble.

We concede the possibility that all these phenomena would have occurred no matter what we did. Perhaps the mini ice-age briefly hesitated for reasons wholly unrelated to human activity and is now getting down to serious business. For that matter, possibly the climatic changes over the past 50 years are no more than minor statistical glitches which will straighten out over the next century. At the same time we should not ignore the fact that a number of profound changes in Earth's climate have appeared only AFTER we set about deliberately cutting back on air pollution.

Some of these changes, for example the disappearance of London fogs, are demonstrably a consequence of the reduction. Others, such as the sub-Saharan drought, are less certain. But the indisputable fact remains that clear, unpolluted skies lead to rapid thermal loss while clouded skies make an excellent thermal blanket and retard heat dissipation. Clear, unpolluted skies are inefficient at transporting water over land. Optimum efficiency calls for considerable "pollutants" to serve as condensation nuclei and to help avoid the extremes where we either get no rain at all or suffer typical desert downpours where the clouds dump their loads all at once to create enormously erosive flash floods below.

We may even accept an argument that our relatively small reduction in air pollution is insufficient to cause climatic changes of the magnitude experienced in recent years. It is still a scientific certainty that at some point along the line the effort to eliminate air "pollution" *must* lead to colder winters and less rain. It is the other side of the coin to the Venus greenhouse effect and is inherent in the nature of the statement.

The process is three-pronged. For one, we have a clearer atmosphere where solar heat reaching the Earth is reradiated back into space every night. This means less heat is available over the yearly cycle and the average annual ground temperature must be reduced. It implies a smaller underground heat build-up so when the first snows of winter fall they quickly deplete the available ground heat and the snow remains on the ground longer.

The second prong develops when the reduced aggregate usable solar heat leads to persistently colder arctic and

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antarctic temperatures and the expansion of the snow blanket. Snow is an extremely efficient reradiator of thermal energy. Increase the snow cover even temporarily and we find even more of the sun's heat being reflected back into space. This means less heat is available to warm Earth.

The third develops when coriolis effects slide evaporated moisture from the tropic oceans toward the north and south polar regions where at least a portion of the moisture is deposited as snow. The moisture which descends onto the arctic as snow is not going to be deposited elsewhere as rain.

Combining the three factors we arrive at a pattern where world temperature reduction tends to exponentiate. Most of the atmospheric moisture falls as snow so the non-glaciated areas become arid. Confinement of water in the form of snow and ice leads to a lowering of the sea level. This latter reduces the water surface area available for new evaporation which thereby increases the drought in the unglaciated areas. The system becomes self-perpetuating over a long term cycle.

Now let us suppose, purely for the sake of argument, that for the past 6,500 years our world has been making an all-out effort to whip up a new ice age but for the past few centuries man has unwittingly forestalled the cold by his use of fossil and wood fuels. We have not only held the cold at bay but have actually pushed it back a little. But it is a fragile victory where even a fractional percentage point of change in the index of air "pollutants" can tip the balance. If our hypothesis is even partially correct it may easily turn out that the one or two percent reduction in worldwide air "pollutants" achieved over the past 35 years will lead to a runaway refrigerator effect rather than the greenhouse effect so often cited by astronomers.

Should this happen one thing is certain: neither Russia nor the United States will sit back supinely and perish as the ice descends. Great nations do not die quietly, and when it comes to sheer survival no national leader will flinch from employing the most extreme tactics . . . which today means nukes. Thus our deep and abiding suspicion that in our eagerness to abolish the demon "air pollution" we may be guaranteeing a far worse catastrophe not far down the line.

But let's be positive for a minute. Perhaps the elimination of air pollution from the environment will not cause a new ice age. Possibly all this is unjustified pessimism on our part. We still have ample cause for concern, a concern arising from the fact that no one has bothered investigating the possibility. It is evident that the prophets of doom have evolved their mythology on the premise that Earth is static and today's climate is all there is. Ice ages are gone and forgotten so there is no point in worrying about bringing on a new one. In the classical sense of the word they have advanced a half-baked idea based on the false-to-fact premise that Earth is static, and have failed to study either the implications or the long-term ramifications of their idea. And this is frightening! In today's technological

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society one or two men of scientific prestige may make a hasty or ill-conceived statement whose consequences a century or so down the line can be utterly catastrophic.

It has been said with some justification that the most dangerous of all ideas is the noble one, the sort of idea aimed at engaging the passions rather than the mind. "Pollution" is merely the latest of a whole series of such ideas. Humankind desperately needs a system to get at least a few people thinking about the consequences of these noble actions and ideas. There ought to be some organized group whose special function is to say, "So get rid of pollution. Its a great idea: now what nasty side-effects can throw a monkey-wrench into the works?" This business of looking for possible damaging outcomes to glorious experiments is almost entirely lacking. It has been left to professional nay-sayers and panic-mongers who usually work from wholly inadequate data to arrive at absurd conclusions.

But the analysis of consequences is too important to be left in the hands of penny-dreadful national newspapers which base their sales on tales of women giving birth to alligators, of visits by the ghosts of dead movie stars, and the predictions of psychics who tell us of Mu, Lemuria, and Atlantis. We also feel it is entirely too important to be left to the mercies of politicians who look only as far as the next election or of business managers concerned solely with next year's profit and loss balance.

It would be nice to believe our university system could take up the slack and fill the niche, but since WWII most have become so beholden to political and corporate funding they do little more than rubber-stamp the decisions of their masters. What is really needed is a scientific *Consumer's Digest* type operation. Sadly, none is anywhere on the horizon. ■

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F.E. Christmas

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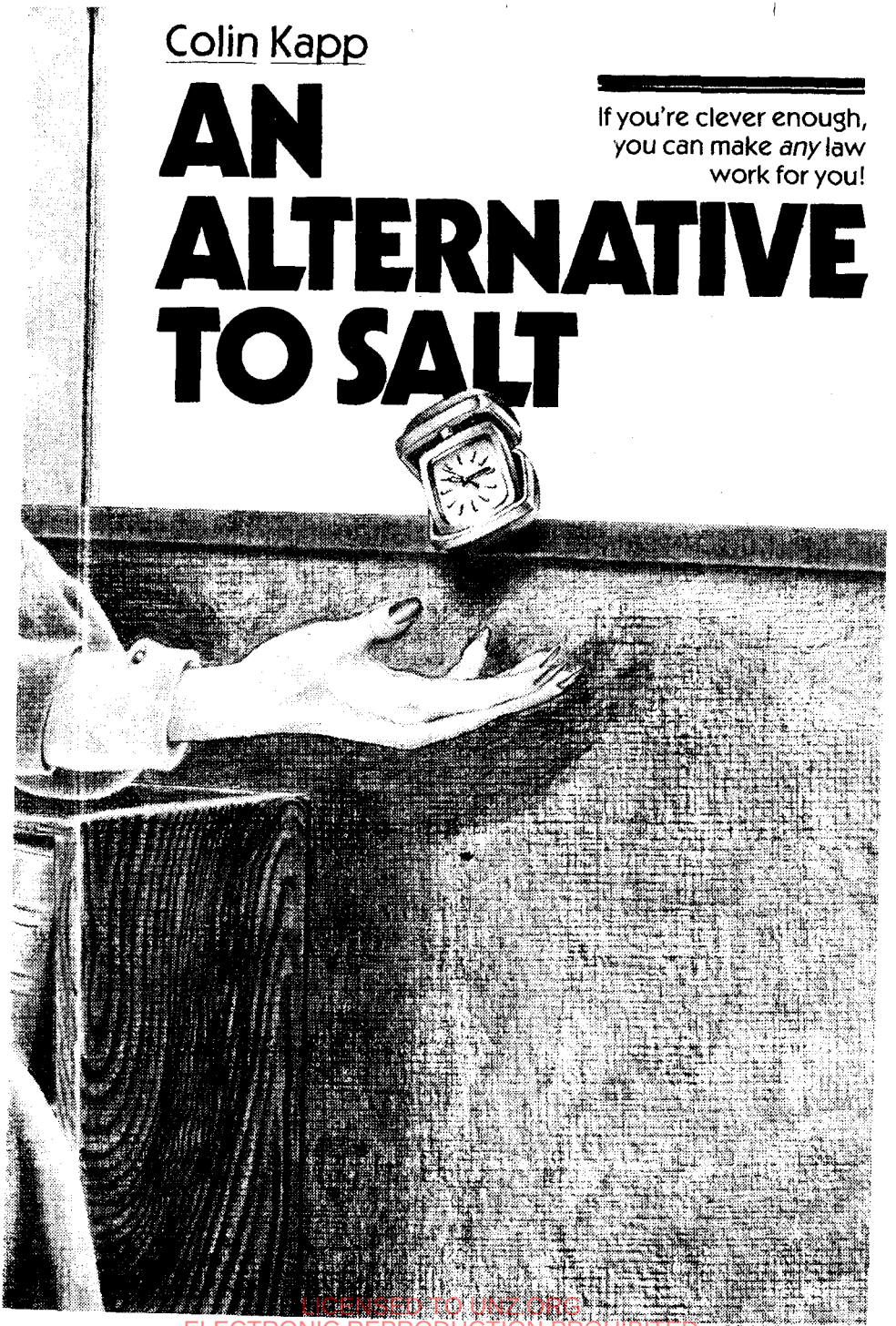

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Vladimir Andreevich Krivoi was a large man with a deep voice so guttural and resonant that it was possible to feel the vibrations it set up in the polished desk top. With a face heavily jowled and a shock of iron-gray hair, his gaze held all the comfort of a lance of arctic ice, and his scowl, a tropical stormcloud. His title of Scientific Attache to the Russian embassy deceived no one. Colonel Krivoi of the KGB was a very formidable man.

The one who sat before him was equally formidable in his own way, but his quiet voice and unexceptional appearance were more suited to his chosen role in life. Georg Metzger—not the name he was born with but the one he currently used—headed an espionage group reckoned to be one of the most effective in the game. Dark-hued of skin, and with a pronounced hook nose, he might have been a merchant trading in a commodity such as wool, but his eyes and instincts were closer to those of the jungle than the City.

Krivoi's large finger stabbed down at the map on the desk. "That's the location, Georg. A new manufacturing plant set up in a disused chalk pit in Sussex. Called AATS Laboratories. All its products are shipped in sealed trucks straight to the USAF air base—there." He indicated another point. "What we need to know is exactly what they are making at AATS."

Fingering his chin, Metzger considered the prospect silently and then asked: "What makes this particular outfit so important to you?"

"Two reasons," said Krivoi. "The initials AATS, whatever they stand for, have come up several times in our intelligence overviews, and appear to relate to some sort of new weapon. Secondly, one of our operatives in the States turned up a very interesting piece of information. The AATS Laboratory is not quite the simple commercial outfit it appears to be. Its paymasters are the CIA."

"Ah!"

"So get in there, Georg. Infiltrate it, bug it . . . do what you like. But I want chapter and verse on what they're making, and the more detailed the better."

"Security?"

"On the face of it, that's handled by a private security firm, but if there's CIA involvement, you can reckon it goes a lot deeper than that. Bound to be spooked pretty heavily. But the laboratory hires a lot of local labor, and nothing suggests they're too thorough in their vetting. Shouldn't be too difficult to get somebody on the inside, but I'll leave that to you. One thing, though. If anything goes wrong it has to be understood that no strings lead back here. It's important they don't suspect we're on to them."

Metzger had acquired the map again and was studying it carefully.

"I have the feeling it's not going to be quite as easy as you suggest, Colonel. There has to be some very good reason why it was built in such an unlikely place. In fact, the site may well be the key to it. I get the feeling there's a whole lot more to AATS than meets the eye.

Somewhere in that part of prehistory called *Cretaceous*, the chalk beds of Sussex were laid down. Billions upon countless billions of tiny unicellular *for-*

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aminifera lived and died in the sea, and their minute skeletons showered down to the sea bed to form the chalk masses we know today. Later, some rearrangement of the Earth's crust brought part of this mass above sea level where, now clad with pleasant grass, it forms the chalk downs of Sussex.

Later still came man, and with man, industry. Chalk was useful for writing and making whiting and putty, and for burning to make lime for agriculture and industry, and hence also as a constituent of cement. This was the origin of the chalk pits from which the native material was extracted, and also explained the close proximity of the local cement works which so depressingly dusted the otherwise green valley.

All these thoughts had gone through my mind on the day I had decided where the AATS laboratories should be built. A disused chalk pit gave us the necessary seclusion, some thirty acres of ground in which our buildings would in no way intrude upon the Sussex skyline . . . and nobody would miss it when it went, as inevitably it must. I even had a little chuckle about the near proximity of the cement works. As an exercise in logistics it could not be faulted. Druze was equally enthusiastic about the site.

"David," he said, with one of his rare smiles, "I think you get it just right."

Allow me a moment to tell you a little about Druze, because to understand the man is to understand a little about the philosophy behind AATS. He had been born in what used to be the Baltic State of Latvia in the years before it had been annexed by the USSR. In the troubled years of the annexation and the Second World War he somehow managed to complete his education, receiving an outstanding doctorate. After the war he took up a job of teaching and research at Dorpat University in the Estonian Republic, where he swiftly established an international reputation for his contributions to theoretical chemistry. It was in fact the international interest in his work, and his refusal to conform to the communist "party line," which brought him into conflict with the Authorities.

Here the story becomes less clear. The known facts are that in 1956, when he was 36 years old, he was branded as a "dissident" and accused of sabotaging his own laboratory. There follows his personal "dark age" in which he was humiliated by a reduction in status and finally incarcerated in various labor camps and occasionally rumored to be dead. We know only that he re-emerged some twenty years later as a guest of the Israeli government, a harrowed ghost of his former self.

The brilliance of his mind, however, had not diminished. Some of his most important work came from his period in Tel Aviv, for which he was awarded a Nobel Prize. It was said by some that he was motivated by a personal desire for revenge against the political behemoth which had swallowed his beloved Latvia. However, those of us who knew Druze later would testify that there was not a vengeful molecule in his whole gaunt body. Druze knew what human suffering was like, and would consent to no part in increasing the total sum of it.

Later he went to America, and it was

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here, continuing some of his earlier work from Dorpat, that he conceived the principles of AATS. This was the start of a chain of events which led him to come, in his habitually unpressed pants and dirty canvas shoes, to help me set up the AATS project in England in the midst of the Sussex downs.

We took an immediate shine to each other. He treated me like a slightly wayward son, and I treated him like the venerable humanitarian scholar he was. Now in his mid-sixties, his experiences had made him look far older; and the lined skin drawn around the bones of his face sometimes gave the impression of a death's-head skeletal mask through which two dark eyes peered comprehendingly at a world less able to comprehend itself. But appearances were deceptive: beneath the mask was the patience and kindly tolerance of a truly great mind.

As chief executive of AATS Laboratories, sitting in an office was not my style. I preferred to be down where the action was taking place. I always found a shrewd eye on the spot to be worth a dozen pages of a retrospective report, and I was also looking for something which hopefully nobody else would see. However, it did mean that a large portion of my working day was spent in an extensive jaunt around the plant.

This day I had started with the assembly shops and clean rooms, where nothing much was amiss, and had worked my way round to the toolroom before I found my first signs of trouble. A large shaping machine had broken away from the bolts which held it to the floor, and under the influence of the heavy reciprocating ram which carried the tool, it had literally "walked" its way several feet from its original position. Of the bolts which had held it, two were sheared off and two had come unscrewed. Since the professional engineers were already into heavy discussion on the matter, nobody asked my opinion, nor did I offer it. Paradoxically, I was the only one who had any idea what had actually happened. AATS moves in strange and mysterious ways.

Sometimes the side effects can be decidedly funny, as that morning also showed. I called into the Plant Maintenance office to let Rodger Kenwood, the chief engineer, know I had agreed his request for extra staff. During the conversation his phone rang, and he broke off to answer it. Seated as I was just across the desk it was impossible not to hear both sides of the conversation, but the unfolding of the tale might almost have been divined from the expression of pained incredulity which spread across his leathern face.

On the other end of the line was Terence Riley, the big Irish ganger who supervised the team looking after the building exteriors and grounds. "Mr. Kenwood, Sorr, could you be phoning to hire a crane?"

"A crane?" asked Kenwood heavily. "What sort of a crane?"

"A big one, I t'ink."

"Riley, what in hell do you need a big crane for?"

"It's the tractor, Sorr. She's in trouble."

"God! Don't tell me you've run it into the ditch again?"

"Not exactly that, Mr. Kenwood. You aren't going to be believing this,

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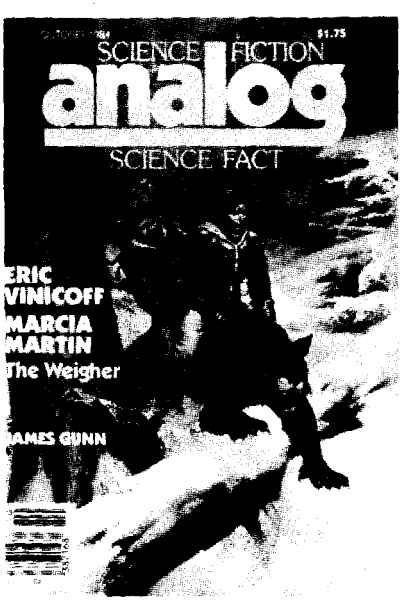

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but she's got herself stuck t'irty foot up a tree."

There was a long silence whilst Kenwood collected his thoughts.

"Terence, this has to be a leg-pull. Not even you bog Irish could manage to get a three and a half ton tractor thirty feet up a tree."

"I'm sorry, Sorr. It was an accident."

"Terence, I'm an engineer, and I would find it difficult to get that tractor thirty feet up a tree by design, let alone by accident. What the hell were you doing with it? Steeple chasing?"

"No, Sorr. We were trying to pull down the dead elm tree by the entrance. We cut part-way through the trunk, then took a cable from the winch on the tractor and tied it high up in the branches. Then I started the winch and stood clear."

"And I take it the tree won?"

"It did indeed, Sorr. And quite an amazing sight it was, to be sure. The tractor slid along the ground, winding itself back along the cable. Then it hit the trunk and climbed up the tree until the engine stalled. Now she's hanging up there like a big red apple, and I don't see any way to fetch her down without a crane."

"Holy Moses! Terence, I think you've just made a name for yourself in forestry. But I'll need a while to figure out what that name should be. I'm coming down to have a look at the mess for myself, and God help your misbegotten Irish soul if I find you didn't have the brakes on. God, this has to be some sort of a joke!"

"Now would I be joking about a serious thing like a tractor halfway up a tree? Indeed I would not, Mr. Kenwood, Sorr." Riley's voice sounded slightly aggrieved.

Kenwood put the phone back on its cradle and looked at me with lips only a little better than mine at repressing a gust of laughter.

"I take it you heard that, David. If you're through with me here I'd best go do some sorting out."

"Sure, I'm through, Rodger. I was just leaving anyway."

Kenwood glanced out of the window at the weather, then reached for his coat.

"Craziest thing I ever heard. Tractor halfway up a tree." He chuckled wryly, and then his face became suddenly thoughtful. "Or would be if something equally crazy didn't happen every day. There's something decidedly odd about this place, David. Things happen which never should. But I'm damned if I can put my finger on it."

I felt he was watching my face, wondering if I was going to react. I had seen him use that searching look before, because he did not believe that some of the stranger things going on around the plant were accidental. He was right, but there was no way I could tell him. Part of his job—a part even he did not know about—was to see if he could figure it out for himself. That is why I had chosen him particularly, one of the shrewdest maintenance engineers in the business. The longer he "could not put his finger on it" the more viable AATS would be.

Krivoi was tremendously angry. He threw the file of papers on the desk with such force that it skidded across the polished surface and fell to the floor by Metzger's feet. The dark man remained

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completely self-composed, and let the file lay where it had fallen.

"We had a deal, Colonel. You wanted to know what was going on at the AATS laboratory. I've told you in detail —quantities, blueprints, photographs, the lot. For that I want to be paid the balance of the fee."

"You've told us nothing, Metzger." Angrily Krivoi had to go round the desk to pick up his own file, which he slammed back on the surface in front of his visitor. "Look at it. Do you know what it is?"

"I don't need to know in detail. I only know that is what they are making at AATS. I understand it's an inertial guidance system for a cruise missile."

"Ha! There you are right. It is an inertial guidance system, and it is for a cruise missile. But which system, and for which missile?"

"That's scarcely my concern, Colonel." The dark man's voice was meticulously under control.

"It is your concern, Metzger. And I'll tell you why. We know for a fact that this model of the cruise guidance system became obsolete about five years ago. It was too large and not sufficiently accurate. Our information is that since that time all the missiles which could use it have been scrapped and replaced."

"It's no concern of mine if what they are making at AATS is not what you hoped they were making, Colonel," said Metzger evenly. "I simply report what we found. Perhaps these are spares for an export deal."

"Georg!" Krivoi hit the desk a tremendous blow with his hand. "Do you think you're talking to children? The Americans do not export cruise missiles, even old ones. No, my friend, you've been taken for a fool. They've allowed you to find exactly what they wanted you to find, and nothing more. The real purpose of the AATS laboratory must be something else entirely. And you missed it. Do you think we care to pay for such incompetence?"

"You'll pay, Colonel." Metzger's voice, though still quiet, carried tones of cold, reptilian menace. "You'll pay, because your personal career depends on it. From what you've told me, you dare not return to Moscow knowing only what that file tells you. Because it makes no sense for the American and British governments to collaborate in an expensive project to manufacture obsolete and useless equipment. Am I right?"

"In that you are right."

"Yet I can prove that is what they are making. I'm a professional, and I've done my research well. I know what materials go into the place, and I know what deliveries go from it. All our information on their manufacturing adds up to a cohesive whole, and there isn't a workshop or laboratory in the place which is engaged in things other than the support of that pattern. Yet now you tell me that because such a mad thing cannot be, something else must be taking place at AATS."

"That is exactly what I am saying."

"Very well, Colonel. When you've paid me for the contents of that file, I will have another look at AATS. I will see if I can discover what is this mysterious something which has no material input, is never packed and delivered, and upon which nobody appears to

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work. But that will be the subject of an entirely new arrangement between us."

Doctor Leonard Rosser, the plant doctor, had been told a little. It had been explained that some of the components coming in from the States might contain compounds which had not yet been fully evaluated for biological effects. This was a lie, but sufficiently close to the truth to cause the good doctor to run a continuing analysis on the state of health of everyone on the plant. Everything from a cut finger to an unscheduled pregnancy was meticulously recorded and became grist for his computerized analytical digests.

It was my custom each day to visit his office around eleven in the morning to review the latest updates. Almost gleefully he would explain to me that there was no sign of anything untoward happening as the result of any compounds we had introduced into the plant. I only wish I could have told him he was wrong, but there was too much at stake. He was a very small man, the little fringe of hair around his balding pate giving him more the look of a tonsured monk than a doctor, and his luminous hazel eyes reminded me always of those of a seal cub imploring not to be clubbed to death.

"Quite the usual sort of stuff again today, David. One of the cooks scalded herself when she slipped in the kitchen, and two of the lads from Assembly had a party last night and have phoned in with chronic hangovers. Mrs. Mills from the telephone switchboard is taking the day off to go to a fertility clinic with her husband. Seems she fears her husband is becoming impotent, so that's nothing to do with us. The four lads who were in the car which ran out of road at the foot of Bury hill are still in hospital, but fortunately only with bruises and minor fractures. And the surgery has been very quiet. We only had three cut fingers all morning."

"That's marvelous, Doctor," I said. "Hopefully we were wrong about those American components. But it pays to be wary when there's a doubt. Perhaps something will show up long-term, so we have to keep this system going."

He looked up from his papers. "You're perfectly right, David. I wish all employers were as concerned about the health of their staff as you are. It could change the whole concept of industrial welfare."

I had to leave then, because I could not stand the mute appeal in those earnest eyes while knowing I was playing Judas.

It was becoming a bit like that song about the days of Christmas:

Four guys in plaster,
Three bandaged fingers,
Two frustrated spouses,
One scalded cook,
Ha! And a tractor in an elm tree.

I do not think I could be blamed for the cut fingers. These things happen anywhere. But the hangovers . . . I had not thought about hangovers before. That could be a nasty one. It had always been assumed that the nature of AATS made biological side effects unlikely. But was it here affecting the rate of dehydration of the body after exposure to unwise quantities of alcohol? Somebody would have to check it out.

Still, no fatalities so far, which was a mercy. Dirty business, warfare. Oh,

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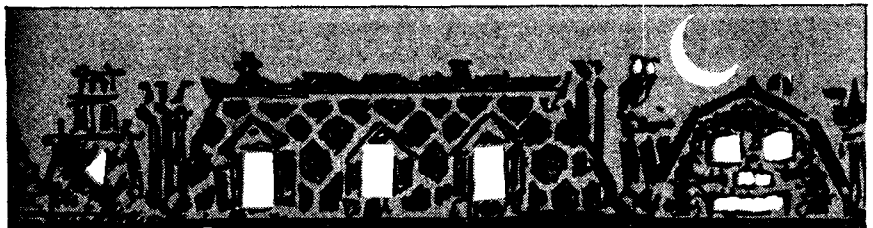

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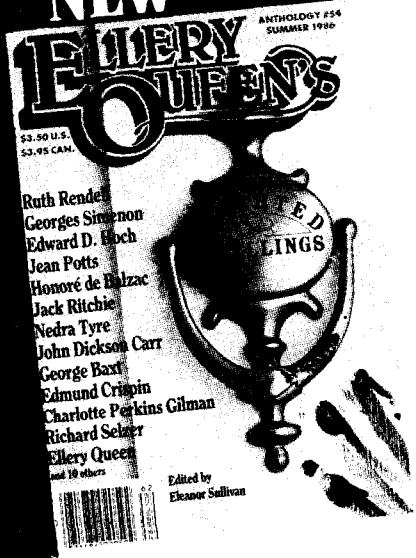

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Doctor Rosser, I think you would never forgive me if you knew how you were being used.

My next stop was at the Process Area, where dwelt my particular and self-inflicted *bête noire*. The Process Area was really a complex of service departments, most of them small, which specialized in such functions as electroplating and metal finishing, precision heat treatments in various atmospheres, the manufacture of small multilayer and flexible printed circuits, and everything from atomic-hydrogen welding through label making to paint spraying and hermetic sealing. My *bête noire* was the supervisor of this complex, Leon Francis, a man with few formal qualifications but with unquestionable expertise in about forty different branches of manufacturing technology.

Leon was an aggressive little imp of a man, with a fleshy, mobile face which was usually occupied by a sardonic and disbelieving grin. We had worked together before in various places, and I have never had a moment's qualm about "poaching" him from some other employer when I was in need of his services. I had a double reason for bringing him into the AATS labs: I needed both his expertise and his independent mind.

Leon could think vertically, laterally, diagonally, and in ever-decreasing circles when he chose, and the principles of materials physics came as instinctively to him as does swimming to a fish. If anyone in the plant was going to guess the true nature of AATS, I figured it was going to be Leon. He was my bugaboo because he was already subconsciously looking for it, and it was important he did not discover it too soon. I think he suspected he was the butt of a very elaborate and expensive joke. Of course he was wrong: elaborate and expensive the ploy was, yes, but AATS was certainly no joke.

Today, like most days recently, there was a crisis in the Process Area. When I entered the plating shop Leon was at the center of a small group which included a shop steward, the laboratory safety officer, and the personnel officer. I had no wish to get involved in the discussion, which would surely be reported to me soon, so I merely lingered within earshot ostensibly looking at some equipment.

Soon I got the gist of the conversation. There had been an explosion in an electrocleaning tank and the operator, although not injured, had been hurried to the Medical Department in a shocked condition for a checkup. Now an on-the-spot enquiry was taking place.

Truthfully, an electrocleaning solution is a fairly innocuous mixture of alkaline salts and surfactants in water, and is about as liable to explode as the average bowl of washing-up water. I could hear Leon's patient explanation to his lay audience as to how this most inert and uninteresting of liquids came to beget an explosion which had taken out two nearby windows and ripped apart a length of plastic fume-extraction duct.

It was all to do with electrolysis of water. The parts to be cleaned were hung on wires from the central electrode rail, while the iron tank itself functioned as the opposite electrode. When current was passed—in this case a hefty thousand amps—oxygen gas came off from the positive electrode, and hydrogen

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from the negative. This was all very usual, because the scrubbing action of the gas provides some of the cleaning action.

What was unusual about this accident was what happened to the gas that had been released. Normally it forms a thin foam blanket at the solution surface, and then dissipates harmlessly into the air: this time, however, the foam layer had persisted and become exceptionally thick, rising to fill the remainder of the tank and overflowing into the extraction duct and over the edge on to the floor.

Now, these foam bubbles, some filled with hydrogen and some with oxygen, contain exactly the right proportion of the two elements for maximum explosive effect. The spark caused when the operator attempted to disengage his cleaned work from the electrode rail was all that was needed to detonate what must have been several cubic yards of explosive foam. Fortunately, because the foam was not constrained in any way, the energy was swiftly dissipated, and the effect limited to a soft blast.

I crept away then, because I could see the conversation was going to become prolonged. Some of Leon's filter pumps were leaking badly at the seal glands, allowing a lot of expensive nickel plating solution to run to waste. I should have reprimanded him for this, but I figured he already had trouble enough for one day. Yet although he was addressing his audience, his eyes were following me with a coldly accusing stare, as if he already suspected I was the author of his misfortunes, but could not yet prove it.

In the medical department Doctor Rosser and his nurse had finished washing the rest of the alkaline cleaner off the luckless operator, and had established no damage had been done except to his overalls and his confidence. Rosser's digest would show only the bare facts of the case, and tomorrow he would confidently prove the event was in no way connected with the presence of any unusual compounds in the plant. Oh, Doctor Rosser! Should you ever learn the truth of this, you'll hate me till the day you die.

On this particular evening Metzger found Krivoi in a more approachable mood, and he suspected that Moscow was giving the KGB man a hard time. Probably a great deal of the Colonel's future prospects depended on the answers which only Metzger could supply. Therefore the meeting was completely informal, and both men settled comfortably into the large leather-upholstered chairs, and lit cigars to complement the excellent cognac.

"And what have you got for me this time, Georg?"

"Not too much so far, except you were right, Colonel. AATS must be being used as a cover for some other activity. But we've not yet been able to discover what that is."

"It's important—for all of us—that you do. The Americans are playing some very strange games with their strategic arms limitations offers, and Moscow's jumping like a cat on hot bricks. Soviet intelligence has apparently made a strong connection between AATS and current American thinking. Therefore any information you can give us about AATS is important."

"All I have at the moment is a par-

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adox, Colonel. As I said before, they are making those guidance systems at AATS, and there's no evidence at all that any other work is going on there. There's no research into lasers, germ-warfare, atomic devices, or anything which could conceivably be used as a weapon. The place is utterly devoted to making those obsolete and useless units."

"A paradox indeed."

"No, my friend, the paradox is still to come. It's what happens to those units after they're shipped which constitutes the real puzzle. They're all consigned to the US airbase, as we know, and which we assumed flew them to the States or various NATO stores. We've been shadowing the trucks to verify their destination. Last week one of our operators, having seen the shipment enter the base, drove on round the perimeter and was surprised to find the same truck leaving by a different gate. There had been no time for the truck to be unloaded, so he rightly concluded that the delivery to the base was a decoy and that the final destination for the units was elsewhere."

"Ah!" Krivoi set down his glass and focused his attention. "Now we're getting somewhere, Georg."

"The truck drove to the Rutherford Laboratories at Chilton, next to Harwell. There's no real security at Rutherford, and sensing a clincher our man talked his way past the gate and actually saw the truck being unloaded."

"Nice work, Georg."

"Wait a bit. He also managed to find out what they did with those highly expensive bits of junk. They put them in a high-temperature furnace—and burned them."

There was a long silence so deep that the predominating sound was that of a remote clock ticking in some adjacent hall.

"Burned them," said Krivoi at last. "Where's the sense in that?"

"Where's the sense in making them in the first place?"

Krivoi shifted uncomfortably in his chair. "A paradox within a paradox. Do you think they're deliberately twisting our tails?"

"For what AATS is costing the American and British governments, there has to be a cheaper way of playing jokes."

"Then crack AATS, Georg. Find out what makes it tick. You'll not find our government ungrateful."

Frank Marvin was my production manager, and I think one of the best in the game. An American, he came as part of the package deal that had been established when AATS was set up, and I have to admit that whoever made the selection knew his trade. Frank was much larger than life in every sense: his physique, both in height and muscular width, dwarfed almost everyone on the plant; and his dynamic energy and utter refusal to take "no" for an answer led to his being both respected and feared. I have known technicians to work all night at some seemingly insoluble task just so they could say "yes" to Frank in the morning.

Gruff, tough, and determined was the way I always thought of him, and if anyone could keep production moving at the AATS labs, that man was going to be Frank. With his close-cropped hair and shirts that shouted with a boisterous

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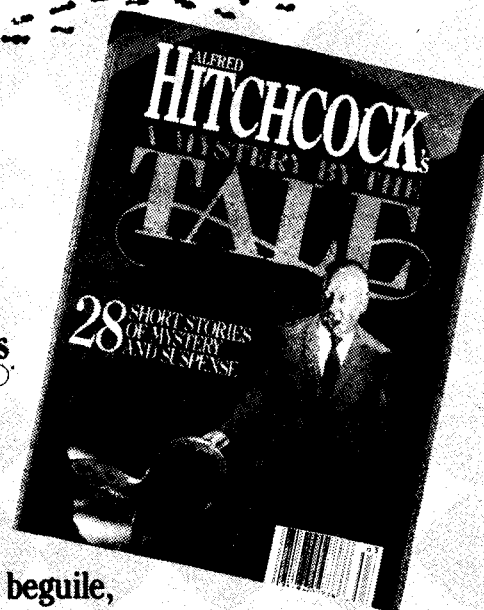

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enthusiasm for life, he was usually to be found striding one of the corridors followed by a little chain of scuttling acolytes, planners, or junior engineers, on their way to sort out the latest "goddam foul-up."

Invariably when he entered my office it was with such impetus that one could imagine his having been fired from a gun, and he would carry a broad smile and a hand ready for shaking. On seeing this, I would put my hands firmly in my pockets and keep them there, no disrespect intended. The handshake was a private joke between us. When I had first been introduced to Frank in Pasadena the enthusiastic pressure exerted by his great paw had caused me excruciating pain, and after three days of suffering I had insisted on an x-ray to assure myself that my finger bones had not actually been pulverized.

However, this morning he was not in his usual buoyant mood. Production was down drastically, but such a challenge normally added zest to his life. Today he had something else on his mind. He gravely handed me a file and waited silently until I had read through it. In the folder were one-page summaries of the latest "goddam foul-ups": two major castings had broken from their clamps during milling on a CNC machine and were an expensive write-off; the automatic turret lathe had slipped something internally and was producing rubbish at a fairly fast rate; a heavy fork-lift truck had got out of control in the machined-parts store and demolished a set of shelves containing diamond-honed parts, all of which would have to be remade; and the latest batch of PTFE rod could not be machined. There were about seventeen pages of similar stuff.

I laid the file on the table. "Why bother me with the details, Frank? You've all the authority you need to get this lot sorted."

"Dave," he said sorrowfully, "you've completely missed the point. What period do you think that list covers?"

"Looks about average for the week."

"Then here's the goddam point. All those foul-ups occurred within the first two hours this morning."

"So it's Friday, and somebody stepped on a black cat. Where you leading, Frank?"

"Sabotage, Dave. You don't get a bum run like that without somebody's goddam fingers pushing the odds."

"I'm not convinced," I said. "This list covers a dozen different departments, and could implicate half the staff. And arranging for a supply of PTFE rod which can't be turned must be about the dumbest bit of sabotage ever."

"Quit stalling, Dave. You know something's wrong."

"I admit it's unusual, but I don't see enough evidence here to start a witch hunt."

"Dave!" This was a statement of reproach. "Play it my way, will you."

"All right. Seeing you feel so strongly. Pick any three of those incidents, and organize a full investigation. Call on anyone you like—engineers, security, outside consultants, or whoever. Spare no expense. If there's one shred of proof that anybody's fingers are involved, we'll have them out of here so fast their feet won't touch the ground. Then we'll throw the book at them."

"Does that apply no matter which way the finger points?"

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"Of course. Nobody's protected. Why the question? Did you have some suspects in mind?"

"Just a couple," he said, and walked out without looking at me.

Later I phoned Druze, and we had a bit of a laugh about it.

Somebody broke into the plant last night, and from the manner of their entry they were obviously trained professionals. On three sides of the plant the rising chalk cliffs left by the quarry workings form a natural barrier against intrusion, and on the downland pastures at the top runs a stout steel fence coupled with suitable warning notices. Because of the exposed location of the fence no secondary electrified barrier could be erected, but many subtle and concealed alarm devices were built into the fence and into the strip of terrain bordering the cliff's edge. Thus the duty security officer, Captain "Mick" Webb, had ample warning when the fence was breached a little after midnight.

There is a standing instruction to cover such incidents: "Sit back and watch." The reason for this is that the fact of intrusion is less important than discovering the intruders' pattern of interests. This tells us a lot about how secure is the secret of AATS. Noting the breach, Mick Webb radioed the dog-handlers to unobtrusively take their charges back to the kennels, switched out of circuit all the automatic alarms, and put his five-man team on silent surveillance using only TV cameras, with image intensifiers where necessary. A random foot patrol was maintained around the grounds for the sake of appearances, but the men were cautioned not to be too diligent in the area where the intruders were expected.

Mick brought me the video recordings of the incident the next day. At one point on the cliff wall some later collapse of the fissured chalk had caused a pronounced overhang to be formed. It was over this precarious edge that the actual penetration took place, and the image-intensified camera, portraying a scene which appeared floodlit but which was in fact in near darkness, picked up the falling of two thin but strong climbing ropes. Later examination of the spot suggested that at least four men had been involved, and a vehicle of the Land Rover type had been used to bring them near to the spot. Only two men, however, actually made the descent, climbing down the two-hundred feet face with the practiced ease of experienced climbers. Both were dressed in dark coveralls with hoods drawn tightly around their faces, and their skins had been darkened with some stain, so that to the camera they appeared as little more than shadows against the gray chalk walls.

They reached the ground at a point perhaps two hundred yards from the nearest building, and again revealed the degree of their training as they made very effective use of every vestige of cover on their swift passage across the intervening space. Obviously knowing the layout of the place, they skirted the assembly block and made instead for the laboratory building, gaining access through a door leading to a chemical stores, to which we subsequently found they had a key. Even had Mick Webb not switched off the alarm system, warning would still not have been given, because we also found the alarm switch

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on that door had been immobilized in advance, presumably by someone working in the plant.

The intruders' next move was interesting, and justified our silent surveillance approach. Both men went unhesitatingly along the corridor and then upstairs to Druze's laboratory, stopping only to pick the lock on the outer door. Using shielded torches, one man then examined every piece of apparatus in the lab and pried into all the drawers and cupboards, while the second went straight to Druze's unlocked office, searched the desk, then spent some time on the contents of the filing cabinet. He was also interested in reading the titles of the books on the bookshelf, as though trying to define in his mind the pattern of Druze's current research interests.

Some thirty minutes later they left the building by the way they had come, careful to leave no traces of their nocturnal visit. As soon as they were back out in the open, Mick Webb sounded the alarm siren, switched on the exterior floodlights, and ordered the release of the dogs. The intruders moved swiftly and without obvious panic to their ropes, and appeared to have a good chance of making a clean escape.

Then something went wrong with their notorious proficiency. The first man appeared to have difficulty in climbing the rope, and finally looped it around his foot and allowed himself to be hauled up and over the ledge by his colleagues above. The second man seemed to encounter the same climbing difficulties, but was less fortunate. At nearly a hundred feet up he suddenly slipped on the rope, tried frantically to recover, then fell dramatically to the ground below. Had he asked me beforehand, I could have told him that attempting to climb the rope in the circumstances was a particularly dangerous thing to do. AATS had logged its first fatality.

The police took charge of the body, and with them came a little, quiet man, who took charge of the police. No word of the incident appeared in the newspapers. The body, that of a dark man with a pronounced hook nose, bore nothing which could help his identification, nor were his fingerprints on file. All we could learn about him came from our video recording. The intruders' concentration on Druze made us fear initially that someone had come closer to discovering the secret of AATS than we would have liked. Subsequent reflection, though, prompted the certainty that they were merely motivated by an interest in why a chemist of Druze's standing should concern himself with such an apparently minor operation such as we were operating in the Sussex hills.

I was not too worried about our secret. To find it they would have had to have fetched in their own very special scanning electron microscope, and known exactly what to look for. There were no samples or references to it in Druze's lab, and I think the only quantity of it in Europe today resides in a small metal phial in the back pocket of Druze's shabby pants.

Things started hotting-up today. Firstly the personnel officer came out of a meeting with the Staff Consultative Council, and presented a demand that we use non-slip polish in all the corri-

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dors. We always did use non-slip polish, so I authorized him to seek the supply of another brand, and if necessary fetch in sub-contractors to scour the old polish from the floors. Everyone except myself appeared happy with this arrangement. I went out at lunchtime and bought myself a new pair of shoes. That did not work either. I got through the corridors without mishap, but slipped on the carpet on the stairs.

Caught my secretary, Angela, playing a new game she had invented. It appeared that if one threw a plastic-covered folder on the desk top at just the right angle it skimmed across the surface as though meeting no friction at all, and went down the back of the radiator. So intrigued was she with this discovery that she could not help repeating it several times just to make sure it was true. Later I heard her swearing because her typewriter would not remain in its accustomed place while she was typing. It, too, wanted to slide around the desktop, but was fortunately too large to go down behind the radiator.

Rodger Kenwood phoned from Plant Maintenance, wanting to sue the contractors who had roofed the Admin office. "Craziest thing I ever saw. Tiles leaking like a sieve." I told him I would arrange for one of our legal guys to be in contact, but did nothing about it. The way things were going, Maintenance were going to have a lot more important things to do over the next few weeks than worry about contractual obligations.

Next the purchasing manager came on the line, wanting to bypass the system and obtain an urgent supply of non-silicone anti-foam for Leon Francis. I told him not to bother, because I already had some. I took a can down to the Process Area myself and set it on Leon's desk without a word. His eyes met mine and he gave me a sort of wry grin. He did not bother to ask how I had so ready a supply. Seems at last we had reached a point of mutual understanding. I got the feeling he was almost enjoying the emerging chaos.

Foam was coming out of everything, nickel-plating vats, copper-plating vats, electrocleaners, spray etchers, and even back out of the drain gullies. I took a second can of anti-foam down to the guy who looks after the effluent treatment plant, but he had gone home. Thinking about this, I decided it was a very wise and sensible thing to do. By this time the multi-colored foam was about a yard above the tops of the treatment pits, and rainbow streaks of it were beginning to be picked up by the wind.

To complete the day, the elevator in the Admin block over-ran its mechanism and stranded ten people in the well, from which they proved peculiarly difficult to extricate. I know, I was one of them.

While I was working late the next evening the phone rang. It was Mick Webb from the gate-house. Was I aware Doctor Druze was still in the plant? Nothing sinister about the enquiry, quite the reverse. The amiable doctor sometimes became so immersed in his own thoughts that he forgot to go home, and had been found wandering around the plant in the early hours of the morning. I promised to locate him and take him with me when I left.

I finally found him in the Process Area, where he was carefully examining

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several items of the plant. Despite his apparent other-worldliness, he was armed with a hammer, a set of box spanners, a Stillson wrench, a screwdriver, and a sheaf of notes. Contrary to the sabotage jaunt in which he seemed to be engaged, he was actually tightening and adjusting various pieces of equipment and logging the results.

"How's it going, Doc?" I asked him.

"Fine, David, fine." He indicated the side frame of a large conveyorized etching machine where several titanium screws had obviously run loose. He tightened them carefully, afterward making a note of the fact.

"Good thing you noticed those," I said. "If that panel had moved out any farther, several of the rollers could have fallen through and jammed."

He riffled through his notes. "Three days ago I tightened those same screws —hard. Once it gets in, there's no hope."

"How about the ones that haven't been touched?"

A faint light of amusement lit his eyes. "The same, only a little slower."

"So how long before we reach the end?"

"About three weeks, I think." He glanced up speculatively into the roof cavity, from which a few pipes dripped dismal spots of water. "Better get Rodger Kenwood and his crew to check the girder on that overhead hoist. We don't want anyone hurt if we can avoid it."

I made a mental note to add this to the growing list of things that needed to be done. Plant Maintenance were going to be rather busy from now on.

"Come on, Doc," I said. "Park your tools and let's get out of here. Frank Marvin would have a fit if he knew you were wandering about the plant after dark with a handful of spanners. He'd scream sabotage, and I'd have to play along with him till we reach the end of the game. There's no way we could explain it."

"Game?" said Druze, lost inside himself again. "You think it's a game? Well I suppose it is in a way. Compared with some other ways of doing it."

Druze seldom laughed, but when he did it was with a marvelously deep fund of humor that welled up from subterranean depths and burst forth like the arrival of a new volcano. It was impossible to watch Druze becoming amused without oneself becoming affected, and for this reason his humor always appeared richer and more memorable than that of other people.

I saw Druze's shoulders begin to shake with laughter just as we left the building; but he had turned away from me to lock the door, and I was initially at a loss to see the cause. Then he turned back and held something out, his old skeletal death's head face, white under the mercury floodlamp, ablaze with an almost childlike glee. The door-handle, complete with fascia-plate and screws, had torn straight away from the wooden door as he had tested to ensure the latch was secure, and now great tears of amusement ran down his lined cheeks as he contemplated the results of this ridiculous mishap. He began to dance a little jig, and we both split our sides with laughter when his shoelaces came undone and one of his old canvas shoes fell off.

He was jubilant. "Heavens, David,

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my boy, it's really working! It's beautiful . . . just beautiful—" He cradled the door handle and examined it proudly under the nearest floodlamp as though it were some sort of international prize trophy—which in a sense it was. Then he handed it to me for inspection, careful not to dislodge the screws which still hung primly in their countersunk holes. Even in the monochromatic light I could see that the screw threads were perfectly clean.

"You're a genius, Doc," I told him, and meant it. Then it occurred to me how few people in the world could really have appreciated the reasons why a chemist of international standing and a senior executive of the scientific establishment should find cause to enthuse about a minor tragedy to such a mundane piece of hardware. But that was the principle of AATS: subtle, unexpected, and working in mysterious ways. Druze's dream had become a reality, but at the back of my mind there lingered a twinge of apprehension. We had opened a new Pandora's box. But did we really know how to get it shut again?

"This could be getting bloody dangerous, Doc," I said to him. "I may have to wrap the whole thing up soon. Before anyone else gets killed."

"Not yet, David. We need a little more time. We have to prove the point beyond all doubt. What you might call overkill, eh?" He nudged me in the ribs with an affectionate elbow, then just as suddenly the humor was gone and the haunted death's-head shone wan under the light. "Just a little more time, David. So much depends on it."

"Okay. We'll discuss it in the morning. Best we go home now. I'll drive you."

Soberly, Druze got his shoes tied on again, and left his trophy in a flower bed. We were both meticulously composed as we drove through the security checkpoint. Pulling out on to the highway I ran into trouble with a slipping clutch, but finally got it to hold. Druze was sitting woodenly beside me, lost in God knows what chain of thoughts.

I do not think he got the point until at the top of the hill I felt the brakes suddenly fade and threw the vehicle on to a rising bank, bringing it to a merciful halt using the inertia of the engine alone. Fortunately this time the clutch did not slip. The road before us dropped away so steeply that my headlamps illuminated only the tops of the trees a little farther round the bend. Had we continued down that hill we would almost certainly have been killed.

"What happens now?" he asked, when he had had time to consider the prospect.

I reached for the radiophone. "We wait for a taxi. Tomorrow they can tow this heap away and bury it deep somewhere. Are you really sure you're in control of AATS, Doc?"

"Only maybe, David," he said after a while. "You know, you're right. It is getting dangerous. But we can't stop it yet. You know what the alternative is."

"Sure, I know, Doc. But right now I'm not certain which of the two is going to get me first."

Early the following morning the phone rang. It was Angela, my secretary.

"I've got Leon Francis in my office, David. He insists on seeing you ur-

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gently. I've told him you're due at a meeting with the finance committee, but he refuses to leave till he's seen you."

"Right. This is important. Send Leon in. Tell the chairman of the finance committee I shall be a little late."

When Leon entered the office it was obvious from his clouded face that he had been working himself up to the point for a long time. He strode straight to my desk and threw an envelope upon it.

"My resignation, David. I quit."

"Mind telling me why this sudden desire for out?"

"Sure, I'll tell you. I've worked with you several other places and over quite a few years. But I've never known you to pull any dirty tricks like you're pulling now."

"Two points, Leon. Firstly, the fact that you've never known me to pull any dirty tricks doesn't mean there weren't any. Just that you didn't spot them. Secondly, all I'm doing right now is honestly and conscientiously trying to keep this damn place running. You're problems are my problems, and believe me I'm not in the habit of manufacturing rods for my own back."

"Then what the bloody hell is going on? We all know you can pick up a piece of equipment made on a Monday which gives you trouble no matter what you do. But it's statistically impossible to find enough of them to fill a whole damn department. But that's what I've got. You're making a monkey out of me, David. I know you are."

"Sit down, Leon, and cool off. You're aware that when you came here you had to sign agreement to the Official Secrets Act?"

"Yes."

"Then what I'm about to say is covered by that agreement. None of it must be repeated beyond these walls."

"I don't see—"

"You will. Yes, you are being made a monkey of. But so am I and so is everyone else on this plant. And there's a reason for it, a damn good reason. Unfortunately I'm not at liberty to tell you what that reason is. Firstly it's a secret so well kept I doubt if more than three people in this country and twenty in the entire world really know what's going on. Secondly, if you were to know it, you could be at great personal risk. That break-in the other night was almost certainly Russian inspired, and they lost a man just trying it. And those men were armed professionals."

"What sort of reason?" he persisted.

"I can only give you a clue at this stage. The true purpose of the AATS labs is not to produce inertial guidance systems at all. They're irrelevant, and don't even use current technology. The real purpose is to discover for how long we can conscientiously continue to make sophisticated electronic and electro-mechanical systems in the face of certain measures which have been deliberately taken against us. It's a challenge, and the results are very much concerned with the future defense of this country, of NATO, and the free world as a whole. That's the damn truth, and I've said too much already."

He sucked his lip. "I'd like to believe you, David. But this all smells very fishy. I don't want any part of it."

"Then I think I've the means to convince you." I took some sheets of paper from a file and laid them before him.

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His eyes recognized them, but his brain refused to co-operate.

"What are these?"

"Copies of your latest bank statements."

"How'd you get them?"

"Never mind. Are they factual, including the level of your overdraft?"

"Damn you, yes."

I laid a sheet of pink paper over the others, and he blinked at it.

"Here," I said, "is a projection of what your bank balance will look like if you stick with us. You won't be rich, but you won't have a mortgage either."

"You'd do that?"

"Consider it done. If you don't believe it will happen, I'll give you my personal cheque right now. I can't say fairer than that."

Like a man in a dream he rose from the chair, took up his notice of resignation and tore it in half. Then he looked at me with a kind of mute appeal.

"How long, David?" he asked at last.

"At the rate we're going, not much longer than a couple of weeks."

"That I'll give you. But the only reason I'm sticking around is because I want to see what the hell is going to happen next."

"Watch yourself on the stairs," I told him. "Somebody had a nasty fall there yesterday."

I never did get to meeting the finance committee. Frank Marvin burst into the office like a living tornado, and he was not a happy man. He had the results of the investigation into the "sabotage" incidents, and they were all negative. Screws too loose, screws so over-tight that some threads had been stripped or even a shaft sheared, slipping clutches, timing belts which refused to control the timing, and cams which had run out of synchronization in places where no human fingers could have reached unless the equipment had been dismantled and rebuilt.

Nowhere was there a cohesive pattern, nothing to indicate anything other than the forces of natural caprice which all equipment is heir to. Murphy's law: *If anything can go wrong, it will.* Frank's problems were not those of kind but of magnitude and frequency. He took several phone calls at my desk from people who were chasing him, and went away growling that he should have become a Jesuit priest as his father had intended. One of his shoe laces was undone.

Rodger Kenwood of Plant Maintenance was already in the growing queue in Angela's office waiting to see me. "Craziest thing I ever saw." Last night's rain had penetrated the roof over the assembly area and a considerable volume of water was now lodged in the cavity over the clean-rooms. Impossible to get at without taking down the ceilings in the clean-rooms, and that would mean having to rebuild and re-commission the dust-free areas. I told him to concentrate on one section at a time, so that we could maintain production, albeit at a reduced rate.

He asked if he could bring in a firm of sub-contract maintenance engineers because his own staff were now completely overloaded. "No problem," I told him. There was a problem, of course. I knew that no matter how many maintenance staff he employed he could never hope to stem the tide, because the

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effects of AATS were escalating fast. The end was in sight, but I could not tell him, and his problems were multiplying so thickly around his head that he could not see beyond them to the simple fact that he was being taken for a very expensive ride.

Sensing I was busy, Doctor Rosser made his own pilgrimage to bring me his medical updates.

"Absolutely nothing to worry about on the chemical side, David." But there had been a lot of falls, with people bruising themselves and things. I told him the personnel officer was already investigating this, and that the two of them had best get together and come up with some recommendations. I never did manage to look into those imploring seallike eyes. I felt as if I had clubbed him already.

The personnel officer phoned to say that the seven girls we bussed in from a nearby village had all resigned. Seems the bus in which they traveled broke down so frequently that they were losing a lot of time, and they had decided to go back to market gardening. I knew that to be a wise decision.

I found Angela engaged in a new version of clock-watching. Although there was a perfectly good electric clock on the wall behind her, she was prone to gauge the imminence of coffee breaks by means of a little spring-wound traveling alarm clock, a present from her husband, which sat on the window ledge to the left of her desk and could be seen without turning round.

Coming quietly into the room behind her, I was struck by the intensity of the attention with which she was regarding it. Then as I stood I began to understand. With every click of its mechanical escapement the little clock moved imperceptibly along the sill until, after probably fifteen minutes, it fell off the ledge and into a strategically-placed waste paper basket. From here it was returned to its original position, only to begin its journeying anew.

She had a fit of giggling when she found me watching her, and explained the phenomenon hastily. I waited until I was in my own office with the door closed before I did my own giggling. It had just occurred to me why they called it a traveling alarm.

It was after lunch before I was able to start my customary rounds. Already knowing the state of the art in most departments from the morning's wails, I headed toward the Process Area, where Leon had been bearing his trials with stoic fortitude and a bitter, sardonic smile. Almost nothing was still working, most of the machines had had their covers removed, and the floor was awash with a greenish custardlike curd of sundry mixed chemicals donated by leaking pump seals and the like. In the midst of this toiled Leon and his staff, armed with tubes of silicone elastomer sealant, and to their credit, they were making some progress.

At the far end of the shop, where it was a little drier, carefully skirting the wet patches on the floor in order to preserve his dirty canvas shoes was Doctor Druze, a soulful smile upon his face, and a faraway look in his eyes. He was standing with his hands clasped behind his back, looking at a painted brick wall. The recent downpour had completely penetrated the brickwork, and was now causing the paint to fall away in sheets

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from the inner surface. I had the impression that the sight transported his mind elsewhere, but whether to Dorpat or to some unhealthy dungeon it was impossible to say.

Leon Francis came up behind me. "He's a nice old guy, isn't he."

"Druze? One of the best in the world," I said.

"He often comes in here and wanders around. Always seems interested in what's going on."

"He's not only interested, he's fascinated. He lives in a world of conceptual models of atoms and molecules all going round inside his brain. The thought that somebody practical can take chemicals and materials and actually make things out of them by welding and turning and electroplating never ceases to amaze him. He doesn't live in our world."

"He's responsible for—" Leon indicated the general chaos—"this, isn't he?"

"No comment."

"Must be some pretty rare sort of genius." There was a slightly wishful note in his voice.

"I'd not have traded his life for mine, Leon."

Leon Francis turned back and scowled at the mess around him. "Oh hell!" he said suddenly, throwing the screwdriver he was holding straight into a box of sodden cloth with which he had been trying to stem some tide. "This is bloody purgatory."

"Don't let it get under your skin, Leon. It won't be for much longer, anyway."

"David," he said, shaking his head sorrowfully, "it'd ruddy better well not be."

Facing Krivoi this time was a younger man, blond, self-assured to the point of arrogance, and with none of the dead Metzger's animal caution and instinct for survival. He had been Metzger's 'mole' inside the AATS laboratory, and the one who had smuggled out most of the information. As a senior planning engineer at the laboratory, he had access to all of the drawings and documents, and unquestioned access to most parts of the plant. He had sold himself to Metzger for a fee, and considered himself a very smart operator. Krivoi's lips curled with an instinctive disgust: honest, painstaking espionage was one thing; greedy opportunist treachery, quite another. Nonetheless the man might still have something useful to say.

The meeting had been arranged on neutral ground, and though the blond might suspect Krivoi's origins and motives he would have had no way of proving it. Nor did it appear to bother him. His eyes were returning frequently to the fat envelope on the table—his payoff fee. Krivoi kept his large hand firmly on the package. He was determined to have his last ounce of flesh, nor did he intend Metzger's sacrifice should have been in vain.

"Georg had a theory that the AATS laboratory was merely being used as a cover for some other activity." Krivoi was playing his cards very close to his chest. He considered the chances high that his blond visitor had no idea that all the expensive guidance units he helped produce were subsequently burnt.

"Not so," said the man, with im-

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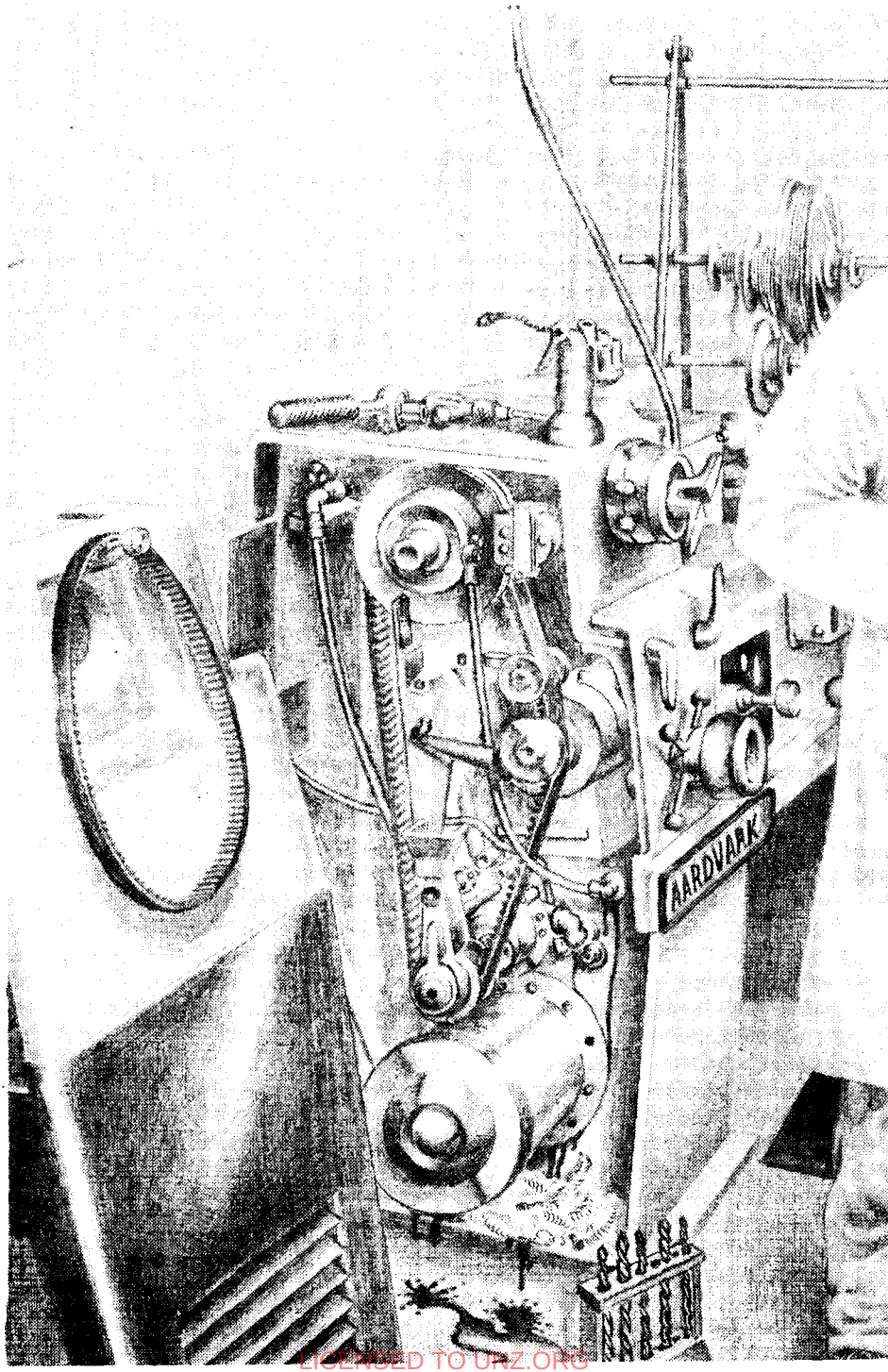

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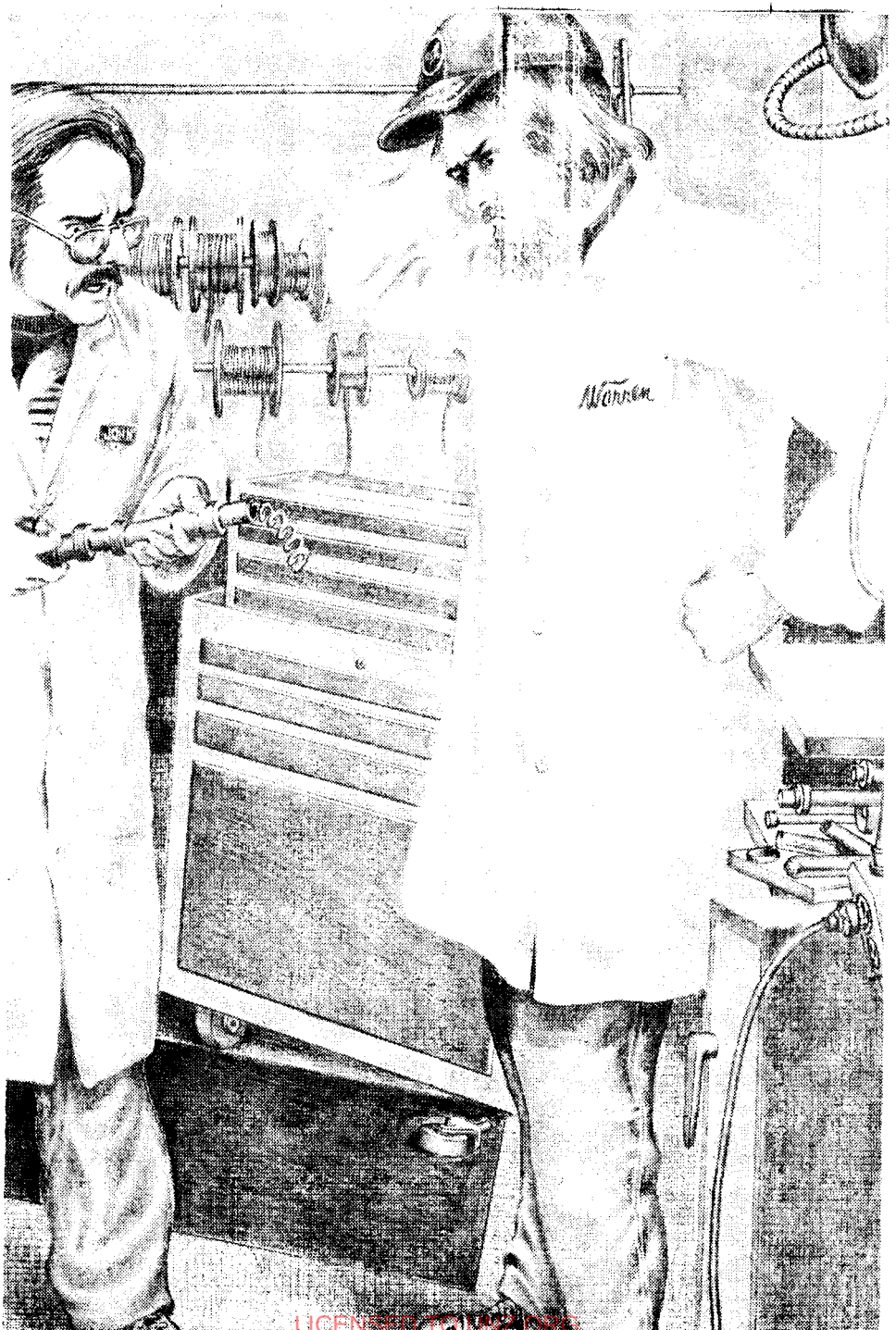

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mediate certainty. "I know every inch of the place, everyone who works there, and everything they do. If anything else was going on, I'd have known about it. I don't see why you're so interested in the dump. It's a washout. Badly run, badly maintained, and their recent record for labor troubles and accidents must be around the worst in the industry. The whole thing has become a farce, and David—he's the Chief Exec —doesn't appear to have a clue what to do about it. One thing's for sure, if they don't put in some decent management soon, they're going to have to wrap the whole thing up."

"Is that a possibility?" asked Krivoi.

"There's a rumor they're considering the termination of contracts, and anyone who gets the offer of another job has been advised to take it. It's the bloody British disease at its worst. Incompetent management and a demoralized workforce. No wonder the Japs are walking all over our industry, and pinching our markets."

Krivoi slid the envelope across the table.

"You've been very helpful, my friend. You've largely confirmed what I had come to suspect, that AATS was an experiment which failed. What I cannot work out is what it might have become had it succeeded."

This was the last night. With most of the staff already dismissed and gone, I had little left to do but collect my personal belongings and make absolutely sure that neither word nor hint of the nature of AATS could be deduced from anything I had left behind. Not, that is, that it would be very easy for anyone to come looking once the site was closed.

However, I must admit I felt a certain sense of loss at the thought of leaving. I had come to love this old quarry, with its randomness steeped in industrial history. I had long been able to visualize the olden days, the breaking of the chalk from the seam with charges of black gunpowder, and loading of the broken chalk on to those curious three-wheeled "dobbin" carts, to be drawn by patient horses up the slopes to the top of the big brick-lined kilns where the lime-burners plied their trade. It was said of the men who worked here that the calcium caused finger and toe nails to grow so quickly that they had to be trimmed every few days. This was a piece of industrial heritage—and I was about to erase it from the map.

I killed all the lights except the desk lamp and went to the window for a last look across the quarry floor to where the old kilns and the bagmenders' shed still stood in wan relief against the gray and grass-streaked walls. Then I heard the sound of the elevator coming up, and shortly a knock on the door. I did not bother to investigate because I had a fair idea who my late visitor would be. From the subsequent sounds he must have slipped on the carpet and hit his head against the door. The muttered oath came through clearly.

"Come in, Leon," I said.

Leon Francis entered, clad still in his white overalls and rubber boots. Without waiting to be asked, he seated himself in a chair. His face was unreadable.

"You owe me some answers, David," he said quietly.

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"About what?" I asked with affected innocence.

"This—" He waved his arm in an all-encompassing gesture. "Just tell me what the hell AATS is all about. I know you've done something to friction and you've done something to surface tension."

"But you can't figure out how it's done?"

"No, nor why it was done."

"Good. I think that means we've succeeded. If you can't figure it, not many can."

"So tell me."

"First I'll need your assurance none of this will ever be repeated."

"Of course I promise. You know me, David."

"Sure I know you, else you'd not be up here now. The story goes back a long way—to nineteen fifty-six, and to the Dorpat University in the Estonian Republic. Teaching and researching there was a brilliant Latvian chemist with a highly original mind."

"Doctor Druze?"

"None other. He was starting to make quite a name for himself in theoretical chemistry, but some of his most brilliant work was never published. He was developing an approach to a whole new range of chemical compounds, which stand to tin roughly as do silicones to silicon. It was when he tried to make them that he ran into trouble—his lab literally fell to bits around him."

Leon looked thoughtful and made to cross his legs so as to sit more comfortably. As he did so, one of his rubber boots slipped clean off his foot, and he gazed at it with an expression of wry amusement. Then he kicked his other leg out, and the opposite boot flew right across the room. So did his sock.

"You've a hell of a lot to answer for, David," he said, after a pause.

I continued. "Druze didn't then get the chance to find out why his lab fell apart. He was in trouble with his political masters, and the wrecked lab was being used as evidence of sabotage on his part. But Druze told me that one of the things that kept him alive during his years in the labor camps was the certain knowledge that the lab disintegrated as the result of cause and effect, not by the action of malicious hands."

"But he found out finally," said Leon ruefully. The knot in his tie kept slipping undone, and one of the pockets was coming off his overall as the securing thread came loose. He was rubbing his fingers together and analyzing the tactile sensation. They were horny hands, yet ones which must have felt to each other like the touch of the slipperiest silk. "Oh brother, he sure found out in the end!"

"Surely," I said. "When he got back to the West he completed the work, and then took a proposal along to the American government. Because of his reputation, they had the sense to set up a high-level committee to examine it. The answers came back: 'Swell idea! Looks as if it might work—and if it works, we need it. Contrawise, if it works there's one place we can't afford to test it, and that's in the good old spacegoing, cruise-missile making, nuclear weapon stockholding United States of America. Jeez, fellas, just think what could happen if that stuff ever escaped—' "

"So you brought it here to England," said Leon. This was as much an accu-

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sation as a statement, and there was an edge of bitterness in his voice.

"I helped to. I don't know what pressures were brought to bear or what truths concealed, but the British government seemed quite cooperative. You'll recall the Prime Minister herself performed the official opening ceremony. My main contribution was to choose this site, well away from any serious local industry, and where we can hopefully contain it."

"Hopefully," he repeated dully. "What happens if it does escape?"

"It won't. We've got plans."

"Well, AATS bloody well works," said Leon. "That I can confirm from personal experience. But what is it, and why is it necessary? You said something about it being used for defense."

"Don't ask me to give you its chemical name. It's a hundred and thirty-two syllables long, and I get lost after the first five or six. For shortness we call it AATS, an acronym for An Alternative To Salt."

"Salt?"

"Not the type you spread on your food. The other SALT—Strategic Arms Limitation Talks."

"Ah!"

"As you know, these talks have been bogged down for years, and the threat of the nuclear holocaust has probably never been greater. But now they have AATS, the Americans can afford to relax a little and make a few concessions. They have another route out of the arms race."

"How? I don't see how you can use AATS as a weapon."

"It's not a weapon. It's an antiweapon. Release a few grams of AATS as an aerosol near a manufacturing plant, and that plant soon hits manufacturing problems. Suddenly the weapon maker finds it difficult to make his weapons, and the more sophisticated the product, the worse it is affected."

"Only a few grams?" asked Leon in disbelief.

"That's its virtue. What we've been exposed to here is an overdose, so the results have become exaggerated and obvious. At lower concentrations its effects are subtle and unobvious—Just a series of apparently unrelated incidents conspiring to make life difficult. Murphy's law in aerosol form. A scent spray can stop a missile plant."

"How much of an overdose did we get?" He was still examining his hands.

"We estimate about five times the nuisance level—the point where things start going wrong and production falls. This is a thirty-acre site, and the total release here was a little over ten grams, applied three months ago by an air burst from a balloon low over the site."

"So very little?"

"A little goes a long way. Physically AATS resembles glycerine, but it has some very strange properties. It migrates and keeps on migrating. Preferentially it comes to occupy the microscopic high-spots on any surface, and is thus effective in concentrations way, way below a mono-molecular layer. Also, the friction of AATS against itself is only the merest fraction of that of wet ice against wet ice. And it positively loves to creep into the microscopic interstices between two mated parts—say a nut on a screw thread. Once particles of it are sitting on that minute fraction of the total surface which is actually in physical contact, it needs only very little

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force or vibration for the nut to free itself or tighten as the case may be, no matter how well it was fastened in the first place."

"Ah-hah!" Leon nodded with sudden understanding. "That explains a lot. Now I can see why brakes fade and belts and clutches slip. It explains why things slide down the slightest incline, nuts come undone, and nails and screws pull out of wood. And when you go to look for the cause of the mishap, you can't find a damn thing."

"Precisely, Leon. You've no idea what a big part kinetic and static friction play in our lives till you come to monkey with them. And when you upset them with a molecular lubricant as powerful as AATS—well, the system literally falls apart."

"Zeesh! I was just thinking of poor Druze in Dorpat. No wonder they sent him to Siberia. How about the reduced surface tension liquids?"

"Much the same mechanism, as far as we know. AATS is virtually insoluble in water, but what small percentage does get in heads straight for the nearest interface—be it liquid-air or liquid-solid interface—and greases the molecules there, so to speak. Unglazed roof tiles or bricks, normally only slightly permeable to water, suddenly start to leak like sponges, and usually water-tight seals suddenly start to leak. There isn't a tap or cistern in the whole damn place that doesn't drip."

Leon put his sock back on, and watched it slide straight off again. "So what about us—the human guinea pigs you used for your experiment? We've been exposed to it, haven't we?" At the back of his voice was a controlled tension which might have been fear or might have been anger.

"True. But the biological effects were well researched before these trials began. As I said, AATS is nearly insoluble in water, and what little does get into the human body is rapidly excreted in urine or sweat. The only adverse effects we've pinpointed so far are a disappointing effect on one's love life, due to a loss of friction, and a tendency for hangovers to be more severe than usual, due to a slightly greater dehydration of the body after drinking excessive alcohol. Both of these effects disappear within a few weeks after the end of exposure to AATS."

"Which is now," he said thoughtfully. "Tell me, David, if AATS is as powerful, pervading, and persistent as it appears to be, how are you ever going to get rid of it?"

"That's a major problem for Druze and myself. We can't stop some escaping, because we've all been carrying small amounts out of the site on our vehicles and bodies for some time. Hopefully what has already escaped will become so thinly spread that its presence will never be noticed. But as for the rest of the AATS which is present on this site, we've had to develop a very special plan to deal with it."

Leon rose to his feet. His face looked grim. "From what you've told me, I don't think you stand a hope in hell. Anyway, thanks for the story, David. And any time you get in need of another guinea pig, don't come looking for me. I've had enough of your dirty tricks to last me a lifetime. Ethics, David. I always thought you had ethics."

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"Sorry you feel that way, Leon. But I had a job to do."

He appeared about to make a very bitter rejoinder, then thought better of it. Instead he grimaced sourly, collected his boots, and headed toward the doorway.

"I hope I never see you again, David."

"Watch yourself on the stairs," I told him. "And I wouldn't advise the elevator. If that goes down in the well again, we're never going to be able to winch it out."

Then he was gone, leaving me to collect my papers and my thoughts. "Ethics," he had said. I was aware of the problem. I had read all of the major philosophers and most of the minor ones, but never could come to decide the exact point where ethics stops and an overriding concern for common humanity begins.

At a time when the dangers of global conflict had never been higher, Druze had produced a chemical and philosophic marvel, an anti-weapon, liquid détente, a diminution of the frightful promise of a third world war. His was a kindly and humanistic—sometimes even humorous—rebuke to the weapon makers. For me that was worth a little lost love, a few broken bones, a couple of scalds . . . Ha! . . . and a tractor in an elm tree.

Although Krivoi's face remained impassive, his emotions were in a turmoil beneath his carefully controlled exterior. The main emotions were fear and a sense of hopelessness, because this was no ordinary summons. Behind the polite aide who came to conduct him, two of his own men, their faces equally unreadable, smartly covered his rear. Nobody mentioned arrest or restraint, but the implications were there just beneath the surface.

Their journey took them to the communications suite, from which most of the regular operators had disappeared, leaving only one at the big console with the Ambassador himself, also wearing headphones. The Ambassador gave Krivoi a fleeting smile which could have meant anything except a genuine welcome, and motioned Krivoi into a third chair drawn up at the console.

"Comrade, you have been honored," he said. "It is not every one who is fortunate enough to be given the opportunity to make his report at so high a level." His inflection was completely without envy. The suggestion was that Krivoi's answers had better be very good indeed. The two KGB men who had followed them were no longer stationed at his back but stood alert guarding the only door from the room.

The radio operator was engaged in a long conversation with Moscow, apparently related to the setting up of an important communications link having a critical time element. Then he suddenly sat up, as if drawn to attention even while still sitting, and handed Krivoi a set of headphones while indicating which microphone had become live. The Ambassador settled low in his chair to listen.

"Comrade Mikhail Gorbachev, General Secretary of the Supreme Soviet of the USSR," announced the operator formally, although his voice held undertones of awe. "Yes, Comrade Pres-

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ident, Colonel Krivoi is waiting to speak with you."

"Colonel Krivoi." The voice—familiar from radio broadcasts but never before personally addressed to him—came through Krivoi's headset with startling clarity. "I am taking the unusual expedient of speaking with you directly because I must have an immediate answer. You will understand the urgency when I tell you I have interrupted an emergency meeting of the Politburo in order to gain the information you have to give. Do you understand me?"

"Yes, Comrade President. I understand." Krivoi's throat had dried, and his words came out thickly.

"In four hours' time our negotiators meet with the Americans again to discuss the latest proposals for strategic arms limitations. Ostensibly the American position seems to be weakening. They have put on the table a package which, if ratified, goes a long way toward meeting our own objectives. But we are cautious. Our intelligence suggests that something called AATS is having a profound affect on American thinking. You have personally been in charge of investigating this thing, yet your latest reports appear to show it all to be nothing, a mistake, a chimera, a blind, perhaps. Now before we meet the Americans at the table again, have you any doubts about these conclusions?"

Krivoi cleared his throat. "None whatever, Comrade President. The whole of the AATS project has been wound up . . . abandoned. As I have reported, it was a classical example of capitalist incompetence and maladministration. Whatever they may have intended to make was never made, the staff has been dismissed, the buildings have been demolished, and tomorrow they start to fill the whole site with concrete. . . . Yes, I said concrete, Comrade President. . . . About thirty meters thick, at least enough so that they have to use cooling pipes to remove the heat while the concrete sets. . . . No, Comrade, I have no idea why it needs to be so thick, nor if they intend to build upon it or under it. All I can say with certainty at this time is that the AATS laboratories no longer exist. . . . Of course I understand the consequences of error, Comrade President. Tomorrow in Moscow I will complete a full report. . . ." ■

● A revolutionary age is an age of action; ours is the age of advertisement and publicity. Nothing ever happens but there is immediate publicity everywhere.

Søren Kierkegard

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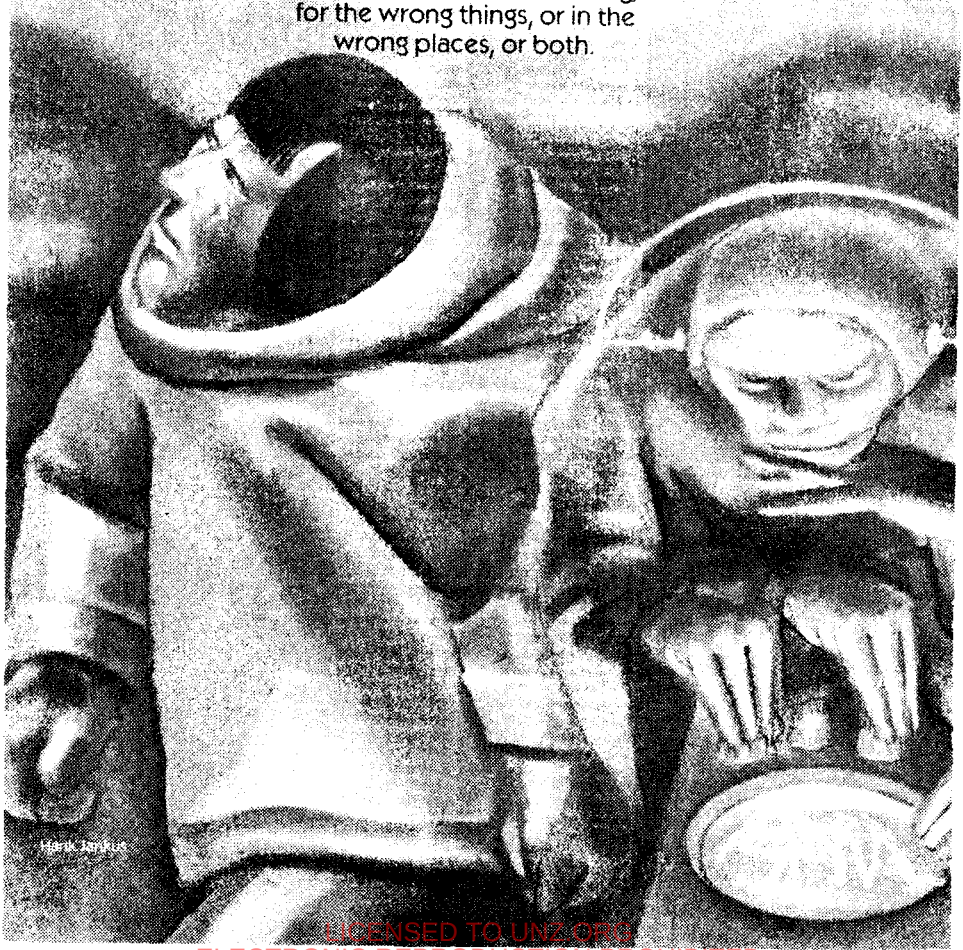
Francis Cartier

THE FREQUENCY OF THE SIGNALS

If a long, hard search has failed, perhaps you've been looking for the wrong things, or in the wrong places, or both.



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"Welcome to the Star Bowl," Dr. Raymond Ward said heartily to the young newcomer, holding out his hand. He had finally selected Pierce as the replacement for poor O'Brien whom he'd had to let go for the second time—but that was another story and Pierce didn't need to know it. "We have a small crew here at the Star Bowl antenna, but you'll like them. I'm sure you will fit in perfectly. As you probably know, we have been funded adequately, though certainly not lavishly, for a number of years now to pursue the search for extraterrestrial intelligence. Most of the recent money has gone into increasing the diameter of the antenna from the 750 meters of the original crater to 1.5 kliks. It's an impressive sight. We have—"

"Oh, I'm quite familiar with your work, Dr. Ward," Pierce replied, continuing to shake Ward's hand rapidly. "Your papers on both cryptography and radio telescopy are brilliant. It will be a great honor and privilege to work with you and your team. I'm really looking forward to it! I want you to know that I agree one hundred percent with your theories about the 'watering hole' frequency. I've read the arguments against it, but it still seems most logical to me that we'll find what we're looking for at around 1550 MHz."

"It's not only logical," said Ward, "but reasonable as well. Any intelligent beings out there would soon conclude that effective and efficient intergalactic communication could best be accomplished at the frequencies that are least cluttered by the general thermal noise of the universe. Any species as intelligent as humans would figure that out and, let's face it, we may be dealing with creatures lots smarter than we are. Nevertheless—"

"Nevertheless," Pierce picked up the cue, "you *have* been trying other nearby frequencies, just in case, and your multichannel pattern-searching computer programs ought to pick up *any* non-natural signals that are being broadcast by them."

"Broadcast or *beamed*," said Ward emphatically. "Remember what I said. They have to be at least as smart as we are. Even to be in the game, our level of technology is the entry level."

"Or beamed. Yes," said Pierce. "What a thought! Oh, I'm going to enjoy working with you!"

"Good!" said Ward with a smile. "Now let's go down the hall and I'll arrange to have you meet the others."

Ward gestured Pierce into the hall and began to lead him down to Miss Harris's office. At this hour she would be off the console and catching up on paperwork at her desk. As they walked, Pierce asked, "How long have you been here, Dr. Ward?"

"Lord! How many years is it? I started in 1947, but I didn't become Director until 1953." He paused and decided not to say that that was the year of the 70% personnel turnover. Nor would he mention that he was so discouraged himself in 1966 that he considered quitting. Change the subject. "Did you know that Obie O'Brien gave you a good recommendation?"

"No! Did he? We only met once in Washington. He worked for you twice, didn't he?"

"Yes. He left us the first time in 1966 to work for the Air Force." That was true but it was a lie. Ward had had to

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let him go because the waiting got to him and Obie had started babbling about hearing signals in his head. "He came back seven years ago, in 1969, and just left us again for a good job with the Bicentennial Celebration taskforce in Washington." Also true, and also a lie. The same old symptoms had returned. "You are a lot alike, you know. Bright. Enthusiastic. Hang onto that enthusiasm."

They had come to Miss Harris's office door. Ward gestured him inside.

Argef, the 12-year-old daughter of Permanent Professor Mollesq, knew very little about her father's work, but she had to find out. Her mother's advice seemed wise. If she really wanted that new pet qwrr to replace the one that had died from excessive fondling, she had better show some interest in his job—or something—that would get his attention. Argef didn't really expect to understand it, but she thought she at least knew some of the words. It was a start . . . maybe.

After dinner, when her father retired as usual to his study to read the incomprehensible journals that came in every Eightday on the Fax, Argef followed him, waited until he was comfortably seated, and asked in the most eager voice she could muster, "Daddy, what's a *fren*?"

PermProf Mollesq stopped in midreach for the Fax switch. He stared with astonishment and pleasure at his daughter. "A *fren*, my dear? Why I hardly think you'll understand. A *fren* is one megagraviquantum." He paused, realizing *that* was no explanation. "It's a unit measure of frequency of a gravitational field. We use it mainly as a unit of frequency variations. Why do you ask?"

The girl's fleeting expression of mixed boredom and incomprehension was almost instantly disguised by a smile, bright, loving, and eager for knowledge. "Well," she said coyly, "I heard you use it several times when you were talking on the sponder just after you got home. What's a *fren*?"

"Hmm," said her father, settling more comfortably into his recliner, "let's see if I can make the idea clear to you. Down at the lab, we are trying to establish communication with another world. To do that—"

"Which other world? *Is* there another world?" Argef had not supposed the conversation would turn out to be this interesting. "Another world?!"

"We don't really know, you see. We suppose that there must be another world and that the creatures on it would have progressed somewhat the way we have. If so, they would have learned to communicate over long distances with things like the Fax and the sponder—or perhaps something similar."

"*Every*body has a sponder, don't they, Daddy? I don't know about Faxes. Do the creatures on this other world have sponders?"

"We don't really know, dear. But if they have the rudiments of science, they surely have some knowledge of one of the most common natural forces such as gravity. How can anyone escape knowing about gravity? So we figure that, like us, one of their earliest scientific inquiries would be about gravity."

There was a pause while Argef's

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expression seemed to be one of concentration on her father's words. That is how *he* interpreted it. Actually, though, the girl's mental effort was concentrated mightily on the problem of how she would work this conversation around to pet qwrrs. After a moment, she decided that there was no easy transition at this point and that her only strategy was to carry on and hope for a better chance later. "So a *fren*," she said as though she didn't quite believe it, "has something to do with measuring gravity?"

"Not exactly, my dear. It's not a measure of the amount or strength of gravity, if that's what you mean. It's a measure of the frequency of—"

"Frequency?"

"Yes, of how often something happens. Let's see if I can think of an example. Yes! You know how a pet qwrr fluffs up its fur when it's happy. Slowly at first, then if you pet it a while, faster and faster. We would say that the happier the qwrr gets, the greater the frequency of its fluffing."

At the first mention of the qwrr, the girl's face had lit up, but her father didn't notice it until he was through talking, so he assumed that the beaming face indicated delighted enlightenment. He was touched. He was also thoroughly pleased with his ability to explain complex concepts by the use of familiar examples. He therefore surged ahead with his mini-lecture, fully confident that his daughter would follow it though she had never before shown the slightest interest in science in general nor in the graviquantum transmissions to which he had devoted most of his professional life. "Sit down, my dear, and I'll explain further."

Argef, astounded that her father had already planted the conversational fulcrum upon which she would, in time, place her persuasive lever, flopped immediately into the 'cliner before her father's desk. "Oh, please," she said.

"You see," said PermProf Mollesq, "the qwrr communicates with the frequency of its fluffing. Now listen carefully, because it gets more complicated now." The girl's expression was one of rapt concentration. "As I communicate with you, each word is transmitted as a different pattern of variations of 'talk' frequencies."

Argef tuned out as her father continued. She thought sadly about her dead pet. When she returned her attention, he was saying, " . . . except for some differences for larger numbers that we need not go into this evening." Argef felt a horrendous yawn coming on and clenched her teeth so it wouldn't show. Her expression remained as studious as before. Once she was sure she had the yawn under control, she said, "And that's what you do at the lab?"

"I'm coming to that," said her father, warming to the task of explanation. "We assume, as I said, that at least *some* scientists on this other world will be experimenting with gravitational frequency variations and that they will certainly be searching, just as we are, for signals from other intelligent worlds. It is also obvious that even the most primitive communication systems, such as the one that you and I are using right now, center around the frequency of gravity waves. So, what we are doing at the lab is using enormous amounts of energy to send out simple series —which ought to be immediately rec-

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ognized as signals from obviously intelligent beings (that's us)—at frequencies around seven megagraviquanta: seven *fren*. We send one second of five *fren*, one of six *fren*, then seven and on up to nine. Then we start over again.

He stopped, noting that his daughter's face was now a picture of puzzlement, though also of almost hypnotic attentiveness. "Have I lost you, my dear? Did I go too fast?"

Argef leaned forward in the 'cliner, her eyes bright. "I think I see," she said slowly as though deep in thought, but would you go back over that about the qwrrs again?"

Marc Goldman had only just punched in at the Maier Gravitron Research Laboratories that morning when he ran into his friend and co-worker, Rebecca Morris. The smiles they exchanged were somewhat more communicative than those usually exchanged by colleagues, reflecting the very, very successful date over in Manhattan the night before. But Becky had something else on her mind as well.

"Have you seen this month's *Maier Lab Notes*?" she asked. "There's an extraordinary article by Schwartz again. He seems to have discovered some new and very peculiar characteristics of the Gee-on."

"So what's he up to now?" said Goldman, linking arms with her as they walked by mutual unspoken agreement to the coffee room.

"He claims he has more data on how gravitrons respond to *observation times!* The correlation is only around .42, so a lot of other factors must still be accounted for, but the implications are mind-boggling."

"Come on, Becky," said Goldman, holding the door to the coffee room open. "You know you can get a correlation of .42 between almost any two variables. If my memory serves me, John Campbell once calculated a respectably high correlation between the reported increased incidence of lung cancer and the increase in automatic transmissions in automobiles!"

"John who? Never mind. I guess you're right. But you'd think the *Notes* editorial board would screen out—"

As they sat down at a table, Goldman reached across, flipped the newsletter open to the masthead page, and pointed at the list of members of its editorial board.

Becky looked. "Oh," she said, "Schwartz. I never noticed. So much for Schwartz and his oddball observations."

"The meeting will please come to order," said the Highest Commissioner on Intergalactic Communicating, though there was certainly nothing like disorder in the room. The five High Commissioners and the forty-six Commissioners and their aides had shushed their conversation into total, respectful silence the moment *he* entered the chamber. "Thank you," he said. "Let us begin by recognizing the new Commissioner, Mee g'Meeghos. Would you stand, please, Mee?"

Of course he stood, looking both humble and pleased with himself—just the right attitude for a new Commissioner. As the welcoming *shshsh* greeted him, he squatted slightly as was ex-

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pected of him, turning to the assembly, then a little lower as he turned back to the Highest Commissioner, then seated himself.

"And now to business. We have an important decision to make this day." His aide stood and handed him a slip of foil. "Ah. I am reminded that, since more than twelve members were absent from the last meeting, we must have a reading of the minutes for—" He turned to his aide.

"26, 45, 34599, sir."

"Yes. Attendance is complete *this* day, I assume."

"Oh, yes, sir."

"Then let's get on with it."

The aide rose to full stature, grasping several foils. "The meeting was convened on 26, 45, 34599 with thirty-two members attending. It was proposed that the Committee on Pattern Distribution provide further justification for the inclusion of fourteen new stars in Galaxy Horb, nine of which would have to be moved an average of 50,440 light-years from their present locations to provide the desired new "signboard" configuration. The Energy Consumption Committee objected that this would require all the allocated energy until 34880, conservatively estimated. The Pattern Distribution Committee stated, however, that the present tri-dimensional pattern, which has been maintained since 31005, should have been recognized as a "signboard" and responded to by now if any intelligent beings existed elsewhere in the universe. The Committee on Semantics was queried but had no recommendation, pointing out that they were divided on the question. The four members of the Semiotics Subcommittee still believe that the present traditional Jjwsogram should appear meaningful to any intelligent observor anywhere in the universe. A second group of four held that additional redundancy in the Jjwsogram "signboard" should be attempted before we give up. Three were undecided, holding three quite different opinions. First, the Priest Representative of Jjws Itself stated that *no* particular pattern of stars would necessarily be seen by unenlightened beings as other than the natural order of the universe. Second, that—"

The Highest Commissioner interrupted, his temper only partly controlled. "*If* there is no objection, we will not continue to entertain the multiplicity of opinions which have so ignominiously degraded the deliberations of the Committee on Semantics. Let them get their committee in order before they report at the next meeting."

There was, of course, no objection. The aide seated himself, shuffling his foils back into order.

"Highest Commissioner, sir!" It was the newcomer, Mee g'Meeghos, bidding for the floor. No one was surprised, of course. A new member was expected to contribute immediately to the discussion, at least in some minor way, to indicate his interest and competence and to demonstrate the wisdom of the Highest Commissioner's decision to appoint him. "Might we not compromise between the positions of the Energy Consumption Committee and the Pattern Distribution Committee? I propose that we make the changes very gradually. Move one star into the desired configuration each 00010. That would surely make a very small increment in the En-

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ergy Committee's budget and would gradually increase the redundancy of the Jjwsogram signal patterns. Perhaps it will be recognized and responded to before the full outlay of energy recommended by the Pattern Distribution Committee is expended."

He sat down amid murmurs from the assembly. It was clearly the sort of idea that the Highest Commissioner liked best. In fact, was it not more than probable that he himself had planted this idea with his newest appointee?

No objection was raised.

"Martha Harris," said Dr. Ward, "this is Harlingen Pierce." Miss Harris extended her hand and Pierce shook it politely. "I'll leave you two to get acquainted. Miss Harris, show him around, would you? I expect him to be able to operate the third Star Bowl console and the auxiliary recorder by the end of the week. When he's operational on those, I'll put in an hour or two a day with him myself to teach him the rest of the equipment."

"Certainly," said Miss Harris. She was always Miss Harris, just as—to her, at least—the boss was always Dr. Ward. She had been with him since 1963—thirteen years—soothed his frustrations, trained new staff members, grown somewhat gray and never lost interest in the project. She knew it nearly as well as Ward did, but she was still Miss Harris and happy—well, not unhappy—to be just that. There was exactly the right amount of familiarity between her and Dr. Ward to suit her.

Ward left and she turned to the younger man. "First," she asked, "do people always call you Harlingen?"

His nickname had always been Buzz, the result of an uncle's whim when he was about two years old. He hadn't liked it since he was twelve. Now, for the first time, he was a long way from Delaware. "Harley," he said.

"Okay, Harley. I'm Martha. Come meet some people and some hardware." They headed down the hallway. "Tell me a little about yourself, Harley. How did you get interested in radio astronomy?"

"Well," he replied, "I've always had an interest in science and technology. My father specialized in magnetochemistry and made some fairly valuable contributions to the nuclear resonance magnetometers of his day. I guess he was best known, though, for his work in proton beam effects on magnetic fields. He taught me a lot about his field, but I wanted to get clear away from all that to make my name in something entirely different. So I did."

"You sure did," agreed Martha. "Turn in here and meet some of the clerical staff."

R3din examined the instrument display for the third time, grinning with satisfaction. He flipped on the intercom and its screen showed his assistant, 3gUs, turning toward it at the sound of the tone. "Yes, sir," said 3gUs, "How does it look?"

"Perfect. Your side?"

"Sir, you'll be pleased to know that beam calibration is also going well. We should be zeroed in on the blue-green and white planet any moment now."

"Let me know when you're ready."

"Of course, sir." 3gUs left the intercom on and turned to his control

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panel for the gigantic proton beam gun. Previous efforts to modulate the magnetic fields of this and similar planets had shown some success. With the increased power and greater stability of R3din's improved signal control system, they might just make a contact.

He watched his instruments carefully. There was little he needed to do; it was all automatic from here on. After a moment, the relative motion compensator read-out stopped at zero. It had determined the last correction and locked on.

"Sir," he said, facing the intercom, "we have it. You can start sending the signal!"

The snow had stopped and the night sky was brilliant with stars as Charlie Two-Seals-Looking pulled his snowmobile up to his house, killed the barking engine, and dismounted. He started to unload the provisions from the back—the last he would need to carry his family through the long arctic night that had almost begun. Then he stopped and looked north, transfixed as he had never been before by the magnificence of the Northern Lights. The aurora had always captivated him, perhaps even more than it had fascinated his grandmother. She had had some spellbinding stories to tell of strange auroras she had seen. When Charlie was in high school, he had been taught that auroras were related to the Earth's magnetic field, but Grandma was not impressed. "I know about the spirits of the lights," she had said, "and the lights are not for the white teachers. They're for us."

As Charlie stood gazing, this one began with a form of shifting curtain that he had seen before, except that it was brighter and seemed to pulse more rapidly than any he remembered seeing. It was mostly in shades of blue, with stark white outlines coming and going.

Then it all turned to an eery, flat incandescent green. The entire northern sky was green with no pattern at all for several seconds. It was like a great luminous chalkboard. Suddenly, a series of enormous, quivering, but nearly perfect red-orange circles moved from west to east across the green sky. Just a single one at first, followed by a pair, followed by a group of three, all moving at a constant rate from west to east. *That* got Charlie's attention!

Charlie Two-Seals-Looking stomped heavily to the door of his house and flung open the door. "Mary! Bring the kids out here! Now! You've got to see this! And turn out the lights in the house so we can all see better." Pulling on sweaters and goose-feather parkas, Mary and the two toddlers came out.

The sky was entirely green again, but it didn't stay that way. Three fiery red vertical bars appeared in the west, moving east across the brilliant green sky. Behind them was a round red light, almost like a punctuation mark, then one red bar, four, one, five, nine, two, six, five. The sky cleared to green again. Then, from the west, the parade of gloriously brilliant red bars began anew. Three (then the red point of light) then one, four, one, five, nine, and so on. Clear. Then again: 3● 1 4 1 5. . . .

But Charlie and his family were not counting. They stood wide-eyed in the cold, clear air and marvelled at the spectacular show. Mary was dumbfounded. "There has *never* been anything like this

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before!'' she gasped.

Charlie wrapped his arm around her waist. ''No,'' he said without taking his eyes off the sky, ''it's happened before, I think. Grandma used to tell about faint circles and some wobbly pillars of fire, but I never understood what she meant. What a shame that she's not here to see it *this* time.''

''They're for us, Daddy, aren't they! Great Grandma said so. They're for *us!*'' the little girl shouted.

''Yes, sweetheart,'' said Charlie, ''they're for us.''■

IN TIMES TO COME

● November's long stories are an intriguingly diverse lot. The cover story marks the return of John Berryman, a one-time *Analog* regular who's been away from these pages for too long. It's a kind of story that many non-readers consider synonymous with this magazine, but which is actually rather hard to come by: a story about technical people who really *act* like technical people, working on a big industrial problem—and I mean *big!* You may remember a certain truly enormous telescope mentioned long ago by E. E. Smith—but have you thought about what it would be like to *build* such a monstrosity? The possibility may not be quite as far-fetched as it sounds—but the biggest problems, as in most big projects, are more likely to be psychological and political than technical.

Some issues back, Rob Chilson and Lynette Meserole had a story here about a not-too-distant future in which medicine had become excessively dependent on a "white box" which seemed to be a panacea—but, of course, wasn't. You might have wondered how the medical profession let itself get into such a fix; next month's "prequel" shows that it seemed like a pretty good idea at the time in view of the fix they were in before. And Michael F. Flynn's "Eifelheim" blends history, physics, and a couple of other unlikely ingredients into a fascinating and memorably unique novella.

We also expect an article by Richard C. Hoagland concerning some features on Mars which *may* be exceedingly significant—and apparent reluctance in some scientific circles to find out for sure.

● One machine can do the work of fifty ordinary men. No machine can do the work of one extraordinary man.

Elbert Hubbard

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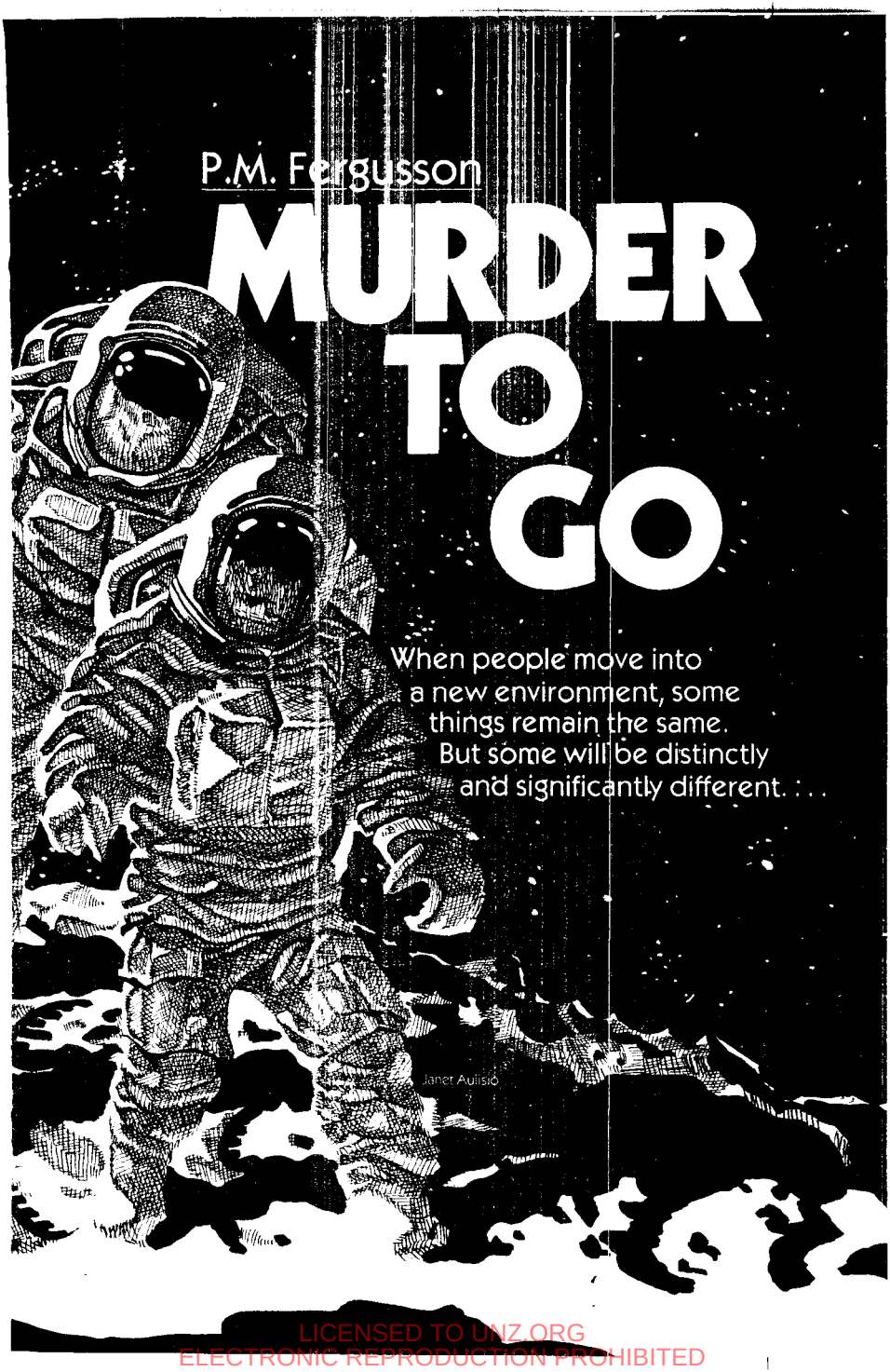
P.M. Fergusson
MURDER TO GO
When people move into a new environment, some things remain the same. But some will be distinctly and significantly different. . . .
Janet Aulisio

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PROLOGUE

"Ladies and Gentlemen, the Darkside Hilton welcomes you to its *Walk On the Moon* tour. Each of you has been suited and checked out by our technical staff, so you'll be as safe as if you were walking on any street on Terra."

"That's not very safe in most places," someone quipped.

The tour guide had heard the same tired joke more times than he cared to count, but he chuckled professionally and replied, "Safer, then. We pride ourselves on our low crime rate on Luna. Now, as I was saying, we won't be outside long enough to need a change of rebreathers, but if any of your indicator strips—" he pointed to an illustrated holograph mounted on the wall of the air lock behind him, "—show any color other than green, don't be bashful about announcing it. We have replacements available, and we're ready to change the pack for you. I assure you that letting a pack go dry will result in the granddaddy of hangovers—with none of the fun that getting one usually entails."

The guide stepped to the airlock controls and announced, "I'm about to evacuate the chamber; the process takes about three minutes, so watch your leak indicator lights. Those of you with children, keep an eye on their indicators as well as your own. No mechanical device is fail-proof, so if a red light shows, or you hear a hissing noise that might indicate a leak, yell." Without further comment, the guide started the air lock decompressing, carefully watching his remote indicator lights for any sign of abnormality in the tourists' suits.

Three minutes later, he asked, "Everyone in the green?"

A chorus of agreement came over his headphones, and he said, "OK, ladies and gentlemen, when the lock cycles open, there will be a slight puff of air. It's nothing to be alarmed about; it happens because we don't evacuate the lock completely—it would take almost a half an hour to get the last traces of air out." As he finished speaking, he toggled the lock controls and watched as the outer doors swung open.

"There it is, ladies and gentlemen, the raw surface of the Moon. No smog, no pollution, no hurricanes or thunderstorms—and of course no air." The guide paused to let the chuckles die out, then went on, "Now if you will follow me, we'll go for a walk. Please stay together, and don't try jumping. I know it's a temptation, but it's awfully easy to get disoriented and land on something other than your feet. You can break your body pretty badly if you land wrong. If you think I'm kidding, think about diving off a chair in your house onto your head. With a standing jump on Earth, you normally don't have time to get in that position; with the lower gravity on Luna, you do."

The guide passed through the lock, and the tourists dutifully trailed after him.

In almost every group there is a rebel. Sometimes it's an adult; sometimes a child. In this group it was a nine-year-old boy, who had already established himself around the hotel as a class-A nuisance. Despite the guide's warnings about bouncing and jumping, the low gravity, open expanse of Luna's surface, and the sense of freedom it gave

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was just too much of a temptation. Willy Leland had to try jumping. Just little hops at first; making sure both guide and parents were looking someplace else, followed by periods of sedate and angelic trudging with the rest of the group. The hops gradually grew into full blown bounces, then leaps two to three meters high and covering six meters or better. Since straight ahead jumping would have taken him into or over the rest of the group, he jumped to the rear or to the side. It was at the peak of one of his best efforts that the guide noticed him.

Several things happened simultaneously. The guide saw him and said in a voice designed not to startle the boy, "Young man, please rejoin the group and confine your acrobatics to the recreation room in the hotel." His mother saw Willy soaring through air toward a dangerous looking pile of rock and screeched, "Willy! Stop that, and get back here immediately!" And last, but most importantly, Willy saw something behind the rock pile that made him forget where he was and what he was doing. Willy let out a yowl that drowned out everyone else and pointed. The pointing was a mistake; it started Willy tumbling. He landed in a spray of Lunar gravel and bounced and slid down the rock pile. When he stopped sliding, he was startled and shaken, but, by some miracle, otherwise unhurt.

Guide and parents rushed toward the boy with the rest of the group trailing behind—half of them secretly hoping something gruesome and terminal had happened to the obnoxious brat, the other half hoping for something merely gruesome.

Willy recovered, was on his feet, up the rock pile and pointing again before they reached him. "Hey!" he yelled, loud enough to make the guide reduce his reception volume, "There's a naked dame in a plastic bag over here—I think she's dead."

Willy was right on all counts, and the tourists who had been hoping for something gruesome got their wish. The nude, desiccated body of a woman, age not determinable due to desiccation, lay on the back of the rock pile, encased in a sheath of clear plastic. The guide took one look, decided it wasn't a grim hoax or a practical joke by one of his weird-minded buddies, and hit the emergency button.

Fifteen minutes later, Lieutenant Simon Arneaux of Lunar Security's Homicide Division stepped from a Security floater, surveyed the scene, and began to curse. Of all the times for a murder to happen, it couldn't have come at a worse one.

1

Debbie Mckenzie Leeds folded her hands on her new husband's chest, placed her chin on her hands, and asked, "Do you think the reporters will follow us to the flight school?"

Jim Leeds grinned down at his bride and said, "You must be joking. We're the hottest news item on Luna. The Chief of Lunar Security marrying his beautiful and efficient Chief of Homicide? That's news with a capital N, darling. Arneaux, Malloy, and company may be able to keep them from mobbing us. But keep them from following? Not a chance."

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"It's ridiculous! I hate it!" Debbie complained.

Jim Leeds feigned an expression of surprise. "You hate being married to me?" he asked in a tone indicating injury just short of fatal.

Debbie bounced up, grabbed a pillow and swatted him with it. "No, you nit," she laughed. "I hate being famous."

"Oh—ouch. Don't pinch so hard," Leeds yelled and grabbed his wife, wrestling her under him and pinning her arms. He kissed her soundly, around her laughter at first, then with increasing intensity. Things were just starting to get interesting when the announcer alarm on their suite's door beeped insistently. Leeds reached out a hand and cut off the noise. "Ummm, now where were we?" he asked.

"In a compromising situation, I think," his wife sighed happily, then frowned. "Jim, maybe you should find out who that was. Not too many people could get to our door in the first place Simon's got the entire floor blocked off, and none of the people who could get through would buzz unless it was important."

Leeds sighed. "True." He brightened slightly and gave Debbie an impish grin. "If I don't like what they say, I can always tell them to go suck rocks." He reached out and punched the who-is-it button on the comm.

Detective Sergeant Bernie Malloy's face appeared on the screen, opened its mouth, suddenly turned red and looked up and off screen.

"Oh shit!" Leeds yelped and hit the outgoing video cutoff. "Sorry Bernie," Leeds said, turning as red as Debbie's Sergeant had.

Debbie buried her face in a pillow and smothered the gales of laughter that shook her. She knew she should be the most embarrassed of all, but the only things she could think of were the expressions on Malloy's and her husband's faces.

Leeds started to laugh himself and gave his wife a satisfying smack on her bare fanny. "Bernie," he said around half stifled chuckles, "my wife may have no modesty or sense of remorse, but I do. We didn't mean to treat you to an impromptu indecent vid. Again, I apologize. Now, what's so important you had to buzz us?"

Malloy had to swallow twice before he could get out, "Sir, Ma'am, I hate to bother you on your honeymoon, but it seems we've got an almost impossible accident or a very gruesome murder on our hands, and this hotel may be involved."

Debbie's laughter stopped as if someone had thrown a switch. She sat up, her face serious and attentive.

Before Debbie could speak, Leeds asked in a voice tinged with a mixture of curiosity and irritation, "Can't you and Simon handle it, for heaven's sake? I mean, your boss and I are supposed to be on our honeymoon."

"Yes, Sir," Malloy replied. "We probably can, but the situation is weird enough that I thought you should know about it as soon as possible."

Debbie put a calming hand on her husband's shoulder and asked, "Who and how, Bernie?"

"That's just it, Captain. We're not sure of either. The victim was found in a plastic bag outside the dome, near the tour entrance to the hotel. She was stark

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naked, Captain, like you—" Malloy cut off his statement and blushed again, even redder than before, if such were possible, then finished lamely, "No vacuum suit, no clothes, no nothing. Ceremonial like, almost."

Debbie supressed another fit of the giggles over Malloy's expression and said, "Very well, Bernie. Tell Simon to start the investigation. Captain Leeds and I will be along shortly. Be sure you keep a guard on the body and don't allow it to be moved until I get there." She thought for a moment, then finished, "I think that's all at the moment, Bernie."

"Yes, Ma'am. Will do," Malloy said, and the screen went dark.

Debbie sighed and swung her feet off the bed. She didn't like the implications of ceremonial death that Malloy had mentioned. "Why did I ever get into this business in the first place?" she asked rhetorically.

"Because you're your father's daughter, darling," Leeds said, "and because you're good at it and love the challenge. Which reminds me, I never got to tell you how much I enjoyed having your dad and mother stay with me while we were getting ready for our wedding. I hope this isn't going to ruin *their* vacation."

Debbie stared at her husband and warned only half jokingly, "If you ever want another favor out of LAPD, don't you *dare* think of recruiting my father. Let him and Mom have their vacation."

"Do you really think he'll sit on the sidelines while his daughter is working on a murder?" Leeds asked innocently.

"If I know my mother, he will," Debbie told her husband with conviction. "She's waited twenty-eight years to get a vacation like this, and it would take a major war to divert her."

"Oh. Well in that case," Leeds took Debbie's hand, "that body isn't going to get up and walk away, and while Simon and Bernie do the ground work, you and I have some unfinished business."

Debbie raised her eyebrows and surveyed her husband. "Good Lord, James. How can you think of such things at a time like this? You are the horniest old man I—yiii."

Leeds took a firm grip on the hand he held and pulled Debbie back onto the bed. She landed in a sprawl, half on the bed, half on top of Leeds. A few minutes later she sighed, "Which is just one of the many reasons I agreed to marry y—mmmmmm."

An hour and a half later, Debbie Mckenzie stood beside a Security floater on the tour trail. "Simon, has the area been holoed yet?"

Arneaux nodded; as his head moved, his helmet reflected harsh shivers of light from the Darkside Hilton behind him and the Crime Lab's lamps to his left. "Yes, Captain, and we've herded the guide and all the tourists into an empty banquet room to get their stories while we took boot samples from their suits—"

"And?" Debbie asked.

"And every print we've found in this area so far matches one or another of the group's suits. Aside from the victim, we haven't found anything that isn't natural. Not even any disturbed rocks that can't be accounted for by the tourists' moving about. The area around the body is clear. No prints, no nothing.

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The guide was smart enough to keep everybody away until one of our units arrived." Arneaux gave a wry grin, "If he hadn't, even the body might be missing; some people will take anything for souvenirs."

"Amen to that," Debbie agreed. She'd known of more than one piece of important evidence that disappeared into the pocket of a souvenir hunter with a taste for the macabre. She finally sighed, "Well, let's take a look at the remains," and trudged unwillingly toward the rock pile.

The body of the mystery woman lay undisturbed, just as the boy, Willy, had first seen her. She lay stiffly on the side of the rocks, hands at her sides, in the position of a diver preparing to make her approach to the end of a high board. The body was encased in a tight fitting plastic case that followed the contours of what had probably been an outstanding figure. It was now shriveled and desiccated like a mummy. Debbie scanned the corpse for signs of explosive decompression. There were none, no blotches on the shrunken skin from ruptured blood vessels, no residue from explosive evacuation, nothing. From all appearances the woman could have been freeze-dried. Neither was there any indication of what had killed her.

Debbie sighed again, and decided she'd probably have to wait for the autopsy to determine the cause of death. "Simon?"

"Yes, Captain."

"What, pray tell, is that body covered with?"

"I can't tell for sure, Captain. Not without running some tests. It looks like the same kind of bag that's used to store grain and other perishables that you want to keep air out of."

"That's something I hadn't heard of, Simon. Explain."

"Well, Captain, it's a polymer closely related to the stuff the domes are made of. Difference is that it will expand or shrink to fit whatever is in it, and the inside is coated with a directional gas barrier, which also prevents the inside of the bag from bonding to itself and shrinking into a useless blob. Actually, the maximum shrink on a bag like that one would probably form a tube with about ten centimeters inside diameter and a meter and a half long. You usually use it by sealing one end with a special strip, filling the bag with whatever you have, and then sealing the other end. The bag will shrink and force out the gas inside, water vapor included, until it can't shrink any further. If you want an inert atmosphere inside, you stick a tube into it and pump in . . . say . . . nitrogen or argon until the air is replaced. The gas bleeds right out until maximum shrink is reached again. Very efficient. Quite inexpensive."

"How come I haven't seen it used around homes?" Debbie asked.

"Too dangerous," Arneaux told her. "It's too easy for a kid to get over his or another's head. It could shrink and kill a child—even an adult—before they could get it off."

Debbie shifted from foot to foot as she absorbed what Arneaux had just told her. She could feel the Lunar gravel shift and crush under her feet. Finally she asked, "If a fresh body were enclosed in such a bag," she gestured to the encapsulated corpse, "then dumped

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on the lunar surface, could it cause that kind of desiccation?"

Arneaux tried to scratch his chin, banged a gloved finger into his helmet, and grinned in embarrassment.

Debbie chuckled and commented, "At least, I'm not the only one to do things like that."

Arneaux returned her laugh and agreed, "Everyone does now and then. Anyhow, about the desiccation, I'm not sure. I don't think anyone has tried it before—not necessarily with a body, but with anything that might desiccate like that. Might be a great way to make prunes," he added as an afterthought. "I'll sure find out though. We can experiment on a leg of lamb or a pot roast—uncooked, of course."

"I surely hope so, Simon," Debbie laughed. "I'd hate to waste a good dinner. While you're at it, see if you can trace that bag." She gave a resigned sigh. "I suppose our next step is to find out everything we can about the victim. Who she was, why she was on Luna, whom she saw, where she went, and who might have a strong enough motive to murder her. We can get started on that while we're waiting for the lab reports." She turned and trudged slowly back to the floater.

"Well?" Jim Leeds asked as she climbed aboard.

"A mess, darling." Debbie told him, "A raging, ugly, honeymoon-wrecking mess." She slumped in the seat and added, "Let's go get something to eat, then start digging into this. I have a sinking feeling it's going to be a long chase."

Jim Leeds said nothing, but gave his wife a consoling hug and started the floater toward the Lunar Security air locks.

2

Detective Lieutenant Simon Arneaux entered Debbie's temporary headquarters in Darkside's Lunar Security building. He laid a stack of foldered reports on Debbie's desk. "Well," he said in a slightly disgusted tone, "now we know who and, maybe, how. But I don't see a hint of why."

Debbie picked up a folder with the seal of the coroner's office on it and read, "Helen Orvis. Age: 23. Occupation: working girl."

Arneaux commented, "That's the coroner's way of saying she pop-shopped the spigots—a hooker, Captain."

Debbie gave him a slight smile, "I figured that, Simon. I believe I've heard all three terms before."

Arneaux grinned without a trace of embarrassment, "I never know, Captain. Earthside slang and Lunar slang don't always match. I recall an episode where a very proper Lunar matron referred to a visiting Terran Bishop . . ."

Debbie smiled and remarked quietly, "The story is apocryphal, Simon. I've heard at least four versions."

Arneaux shrugged, "Ah well, I had to try."

Debbie chuckled and picked up the report again. "We now have a young lady of the street stuffed in a plastic bag and dumped on the open surface of the Moon; very dead, probably very murdered. Death by asphyxiation, according to this report. No detectable trace of drugs or poisons. Which doesn't mean there weren't any; the dehydration process can destroy a lot of common

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sedatives. Especially ones in liquid form. No sign of violence. Desiccation makes fixing the time, or even the date of death unreliable."

"They may not have found any drugs, Captain, but I'll give you ten for one she *was* drugged before she was put in that bag."

"I agree, Simon," Debbie nodded, "but give me your reasons for feeling that way. We may be deriving the same conclusions from different evidence."

Arneaux nodded. "Mostly the position of the body, Captain. She was laid out straight, arms at her sides, eyes closed. Not a sign of a struggle, either before or after she was put in the bag. She wasn't banged over the head; no bruise. The bag wasn't slipped over her while she was asleep. If it had been, she'd most likely have awakened and started to struggle, in which case, I'd expect her hands to be upraised in a pushing posture, and her eyes to be open."

"About my line of thinking," Debbie agreed. "But couldn't that have happened, and then, when she was unconscious, the killer rearranged the body?"

Arneaux shook his head. "I doubt it. Those bags shrink fast and tight. The killer would have had to either open the bag, or use a lot of force. If that had been done—or if a different bag were used to kill her, then removed—I'd expect to find some bruising."

Debbie nodded. "That does reinforce the theory that someone drugged her, then shoved her into the bag and let her suffocate." Debbie leaned back in her chair, wincing as it squeaked loudly. "But why, Simon? I can't buy the idea it was robbery or an angry customer. The murder was obviously carefully planned and executed. Not a chance it could have been an act of sudden rage." Debbie sighed. This kind of killing was often almost impossible to solve, and, unless someone with a strong motive was found, it was always a long, tedious procedure. "What else do we have so far, Simon?"

"The lady was a freelance; no . . . ah . . . patron, no boyfriend, no close friends. She was born and raised in Luna City. Her parents are still living and have been notified. The few people we've talked to so far say she was always something of a rebel with a taste for fast living. As far as we can find, she was last seen four days ago. Nobody got alarmed. The other girls who knew her figured she'd either found a tourist who liked her style and was keeping her for the duration, or she'd slipped off to visit her parents."

While Arneaux had been talking, Bernie Malloy had slipped in the door and listened quietly. When Arneaux summed up his report with an apposite shrug, Malloy added, "There are a lot of nervous ladies on the street since this got out, Captain. We're getting rumbles that others have suddenly disappeared over the past year or so."

"Any names or dates, Bernie?" Debbie asked.

Malloy shook his head. "Nothing solid at all, Captain. Just a rumor here and a nervous comment there. Probably nothing more than nerves and hysteria, but we're working on it."

"Anything else, guys?"

"Not a thing so far, Captain."

"Well," Debbie told them, "lets get back on it then." She added in a re-

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signed voice, "For all the headway we're going to make. I *hate* this kind of case."

Arneaux and Malloy nodded agreement and departed.

When they were gone, Debbie rested her head in her hands and cursed silently. First her vacation, then her honeymoon. Captain Debbie Mckenzie was beginning to feel a very personal animosity toward Luna's brand of killers. God help us, she thought, if this is the work of some psycho. It could turn into a real blood bath before we run him down—or her.

By the end of the week Debbie had interviewed the tearful parents of the murdered girl, several of her known associates, and a plethora of bartenders.

"And?" Jim Leeds asked in an equitable tone, propping one foot against the edge of her desk and sipping cautiously at a cup of station house coffee, "what have you learned from all this frantic activity?" He glanced first at Arneaux, then at Debbie.

"Exactly one thing we didn't know before, Jim," Debbie told him. "Helen Orvis was last seen in the company of a tall, slender, short, handsome, rather plain man with black, curly blond hair, who carried himself erectly and walked with a stoop and a limp—" she shook her head in frustration, "—three days before little Willy the tourist found her body."

Debbie tossed the folders on the desk in front of her with an irritable gesture. "One of these days, I'm going to run across three witnesses whose descriptions of a suspect agree, and I'm going to faint from the shock."

"And then," Leeds commented, "find out that the witnesses are the actual killers, which is why their descriptions tallied in the first place."

"Probably," Debbie agreed in disgust.

Simon Arneaux picked up the folder Debbie had tossed down, and opened it to the transcript of a particular interview. "Captain, I've known Jake Marples for quite a while. He's sharp. His observing eye has done us some real favors in the past, and of all this mess, I'd take his account most seriously."

Debbie reread the transcript Arneaux had pointed out. "Medium build, about fifty. Gray hair, worn stylishly long." She gave her husband's short brown hair a raised eyebrow.

"I'm too old to change, woman," Jim Leeds said simply.

"You'd look good, Jim. You really would. You've got beautiful hair."

"I'll think about it."

Debbie gave up and went back to the report. "Slightly jowly with an accent the bartender couldn't place. Nothing distinct, just a blurred overtone that made Jake think the guy wasn't a native of Luna. Not much to go on."

"That not being able to identify the accent, Captain," Arneaux interjected, "may be a lead. Accents are one of Jake's hobbies. If he couldn't identify it, it must be pretty regional and not common on Luna, or a blend of several accents caused by multilingual capabilities."

"Could be important at that. But where do we—"

"Captain—" Bernie Malloy knocked then entered immediately. His face told the whole story.

Debbie looked at him and, before he

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could continue, said, "We have another one. Ooh—Damn! I was afraid this was going to happen."

"Yes, Ma'am. A troop of scouts on an overnighter found the body near the edge of their campground. I've got a squad on the way, but from what the scoutmaster told me over the comm, it sounds like the same M.O. Body laid out like for a funeral and neatly bagged."

Debbie forced herself to her feet and looked at her husband, "Some honeymoon, huh, darling." In response to his grimace, she said, "Well, let's go look at the scene. I doubt we'll learn much, but we may as well go through the motions as sit here sucking our whatevers."

3

Debbie turned away from the desiccated body. As Malloy had reported, it was neatly bagged and lying in a depression, now harshly lit by the Crime Lab arc lamps. The scene, position, and condition of the body were similar to the one she'd examined a week past. The woman had long dark hair and, Debbie thought, had been extremely good looking. Even the wrinkled and shrunken condition of the victim couldn't totally erase her fine-boned beauty.

Debbie walked thoughtfully toward the scoutmaster who was sitting in a stunned slump on a rock in front of the partially deflated tents of his troop. Behind him, the troop was disassembling the camp they had so carefully erected a few hours earlier. The Scouts held helmet to helmet conversations with each other as they worked and cast glances at the Lunar Security officers moving about the site. Glances whose tone ranged from intrigued, to technically interested, to purely disgusted.

Debbie knelt beside the scoutmaster and palced her helmet against his so they could talk in private, "Mr. Hawley-Cooke?"

"Yes, I'm Arnold Hawley-Cooke."

"I'm Captain Mckenzie of Lunar Security's Homicide Division," she introduced herself.

"Yes, I know. The boys' parents are going to be a bit mucked up about this, you know."

Debbie remarked sympathetically, "Perhaps not. Not unless the boys are."

"Ah yes, the boys," Hawley-Cooke chuckled bitterly. "The little blighters are having a field day. Only thing most of them are up about is having to leave and miss the fun. If I hadn't cracked down on them they'd have disassembled and bagged the entire site."

"Really?" Debbie prompted.

"Really," Hawley-Cooke replied. "Bloody little monsters have a fascination for the grotesque—all boys do, I suppose. The one who discovered the body has been studying for a merit badge in police work. Best he did."

"Excuse me?" Debbie asked in a slightly puzzled tone.

"Best it was Vincent who found the body, I mean," Hawley-Cooke explained. "Backed away over his own boot prints and kept the others from rampaging about the site playing detective. I really don't know how the parents are going to take this." Hawley-Cooke rambled on, "Bloody ticked, I'd wager. I came to the Moon to get away from crime in Southend and walk right into the middle of a bloomin' sex-crime murder scandal."

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"How do you know it's a sex crime, Mr. Cooke?" Debbie asked.

"Broad's bloody naked, ain't she? Must be a sex crime."

"You may be right, Mr. Cooke," Debbie answered and gave up. She wasn't about to get any useful information from the befuddled scoutmaster.

"Hawley-Cooke," he told her absently, "with a hyphen."

Eighteen hours later, the investigation had progressed only marginally and become considerably more infamous.

"Millicent Acker, better known as Loreli Candle, star of Vidcomm, TriD, and, more recently, soap-opera," Jim Leeds growled. "Just wonderful. We have two ritualistic murders, no viable leads, and now, reporters crawling out of the ventilation ducts. Do you know, I caught one trying to hide a mike under our bed and bug our comm unit for continual broadcast?"

Debbie McKenzie looked up and almost laughed at the absurdity of the situation. What had the vidhawk thought he was going to get, porno movies? She *almost* laughed, then she saw the gathering storm on her husband's face. "You were diplomatic, I hope," she said. "We may need all the good will and help we can find before this is over."

Simon Arneaux and Bernie Malloy, leaning against a nearby wall, nodded in silent agreement.

"You think there'll be more?" Leeds asked.

"More vidhawks?"

"More murders."

"I hope not, but I'm afraid so. There's too strong an element of ritualization for it to be casual happenstance. Both of these murders have been planned, and planned well in advance."

Leeds looked startled. "You mean someone planned to murder both those women? How's that possible? The first, maybe, but this vid queen's only been on Luna for less than a week—and she arrived incognito. She used her real name rather than her stage name, and even dyed her hair."

"Sorry, darling," Debbie apologized. "I didn't mean that the killer planned to murder these women in particular, simply that he—or she—had planned to kill someone for a long time. But why? More than anything else, we need some lead as to why."

Leeds nodded. "You may be right, Debbie. Maybe as we find out more about Millicent Acker's reasons for coming to Luna in the first place, and her movements since she got here, we'll get a clue."

Councilman James Hardt's voice announced from the doorway, "I certainly hope so. Have you been watching the Vidcomm lately?"

"Not really, Councilman," Debbie replied. Where would I dig up the time?"

Hardt nodded. "I thought that might be the case, so I brought this along." He held up a datacube and plugged it into the comm unit on Debbie's desk. He leaned across the desk and smiled fiercely at her, whispering in mock fury, "Debbie, if you call me Councilman one more time, I'm going to spank you. You are my niece by marriage, and if everyone else can call me Uncle Jim, you'd better, or I'll judge you unsuitable for my nephew and annul your marriage."

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"Too late for that, I'm afraid, Uncle Jim," Debbie laughed. "Your sex-crazed nephew has violated my poor body already." She couldn't resist giving Bernie Malloy an impish look, adding, "in front of witnesses yet."

Malloy blushed a deep rose, but chuckled, "I'm afraid she's right, Councilman."

Hardt stared at Malloy, his face writhing with silent laughter—he'd heard about the episode of the comm unit. He finally chuckled. "Same warning applies to you and Simon, Bernie. In private, I'm Uncle Jim or nothing."

"Yes, sir, Councilman," the pair agreed in chorus.

Uncle Jim raised his hands in mock despair and said, "I give up. Let's get back to the current problem. Half the people are screaming because you haven't solved the murders. Some don't really give a damn. However, there are a lot following the lead of old Abraham Joshua Scithers, my least favorite colleague." Uncle Jim pushed the playback button, and the screen came alive.

The recording had obviously been made in the Lunar Council's general chambers. "This is just one of Councilman Scithers's recent addresses to the assembly," Uncle Jim explained.

A gray-haired man was standing in a positively biblical pose, lacking only the long staff to be a perfect imitation of Moses—the cane he waved aloft was a poor substitute. "It is the hand of the Lord Almighty that is removing these Whores of Babylon from our fair Luna!" The man's cheeks and jowls shivered as he delivered the line. "Too long have these scarlet women preyed on our population, corrupting our children, insinuating their filth into our very schools! And your money—the bread taxed from your mouths—is being used to oppose this Instrument of the Lord."

Debbie watched and listened as Councilman Scithers ranted on, castigating everything from the mawkish sentimentality of liberal education to the decadent inadequacy and moral turpitude of current literature. "There is only one book we need follow," he roared. "The Book of God, The Book of Truth, The Holy Bible!"

"Is he for real?" Debbie asked. "He can't be serious, can he?"

"'Fraid so," Uncle Jim said. "He was a good man, a little tight minded, perhaps, but conscientious until he got religion about a year ago. Now—" Uncle Jim shook his head in despair. "I think he's gone senile; around the Council he's being called Old Sword-of-the-Lord Scithers, but he's got enough support we don't dare remove him. We'll just have to see he's not reelected. Need to find a good strong candidate to run against him next time."

Hardt's eyes strayed toward Jim Leeds, and Leeds took a step backwards. "No you don't, Uncle! Get that look off your face, and the thought behind it out of your mind. You may have set me up and conned me into *this* job. But! I'll be damned and go to hell if you'll con me into politics."

Debbie was suddenly intriqued, "*Conned* you into being Chief of Lunar Security, husband? This is a story you haven't told me about your seedy past. Talk now, we need to get our minds off this mess for a minute anyway."

Jim Leeds did his best imitation of anguished despair. "I wasn't always as

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you see me now. At one time I was a happy, confident engineer, designing electronic surveillance and security equipment for home and government."

"Hams it up a lot, doesn't he?" Uncle Jim interjected.

"Shut up, Uncle. This is my story," Leeds growled in mock anger, then chuckled and continued, "If you design security equipment, you need to know a lot about criminology and criminalistics—you can't catch a crook or foil him if you don't know how he operates. Anyway, I took a couple of degrees in the subject on Terra—strictly to make myself a more competent engineer. When I got back to Luna, Uncle Jim conned me into accepting the post of Director of Criminalistics in the then forming Lunar Security. Then a few years later, he railroaded the Council into appointing me to the post of Director of Lunar Security."

"I categorically deny doing any such thing," Hardt inserted. "I even nominated another man entirely."

"Whom my dear uncle knew the Council wouldn't accept," Leeds said. "Behind the scenes . . . I know you too well, Uncle."

Hardt shrugged and grinned.

"And that, dear wife, is how I came to be what I am today, the target of every nut and crank complaint on Luna, instead of a happy and successful engineer, which is all I ever wanted to be."

Debbie frowned, and asked, "You're not happy with me?"

"Of course I'm happy with *you*, darling. It's this damned job I could cheerfully do without."

"But you *are* good at it, dear," Debbie told him. "You'd be just as good as a Councilman. It's your nature to do the best job you can, no matter what it is."

"Uncle! You've been corrupting my wife!" Leeds yelped.

Malloy and Arneaux were holding each other up to keep from collapsing in laughter.

Leeds gave them a dirty look, then got a cagey expression and asked, "And just whom are you planning to replace me with, Uncle?"

"Oh, I'm sure the Council could come up with a competent replacement in the two years till the elections," Hardt stated calmly.

Debbie felt a sudden sense of unease; a new boss might be competent, but he'd never be as easy to work with as her husband. Then again, she thought, it might be wiser at that. Avoid conflict of interest and all the whispers and nasty comments that their marriage had given birth to. The Council might even . . . She cut the incipient thought off before it was even fully formed, rejecting it as ridiculous. She had nowhere near the experience required. She missed the speculative grin Uncle Jim directed at her and ignored the sudden chill that tiptoed along the nape of her neck. "This is enough political discussion," she announced. "We need to get back to matters at hand and find out what Millicent Acker—or Loreli Candle, if you prefer—was doing on Luna, incognito, and how she put herself in a position to be murdered in the first place. Let's hear your ideas, gentlemen."

4

It took almost a week and proved to

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be a combination of solid, routine police work and luck that gave them their answers.

"The bartender remembers her real well, Captain," Malloy explained. "He says he noticed her and paid attention because he doesn't get many pop-shoppers with her looks and style. He wondered what a looker like that was doing working the spigots in the first place."

"I wonder that, myself," Debbie remarked. "It must have been for the thrill; she sure didn't need either the money or the attention."

Malloy indicated complete agreement with an emphatic nod, then went on, "She left with a tube-snake by the name of Vassily Ribicov—big man considering his occupation; most tube-snakes are runty little guys. The barman says he's a regular in the Rock Toad's Retreat. We're looking for him right now."

"Problems?" Debbie asked.

"Nothing odd, Captain. If Ribicov has gone back to one of his holes, he may be hard to find until he comes in again for a spree. Those free miners are cagey as all get-out about where their holes are. They can be harder to find than the proverbial Lunar Swamp Dragon."

"Well, do your best, Bernie. Take all the men you need. It's awfully unlikely he's our killer, but we have to talk to that guy. He may have seen something, and if he did, we need to know what. Let's just hope our killer doesn't think the same way. Ribicov's life may be in real danger if that's the case."

"Yes, Ma'am," Malloy agreed. "I'll get every available man on it."

Debbie nodded, then turned to Arneaux. "Simon, you're holding that stack of folders like they're about to explode. What have you got?"

"A lot of data on our actress, some public, some private. It may answer a lot of basic questions. But best of all, I've got the victim's agent—a Jean Button—waiting in the outer office. He arrived on Luna yesterday to claim her body, and he contacted us as soon as he arrived. I think he may be a lot of help."

"Good!" Debbie smiled. "We need all the help we can get with this mess. Give me what you've got, then we'll talk to him."

Arneaux opened the top folder in his pile and referred to it for a moment, then began, "Apparently, traveling incognito is a common practice among Vid personalities. Miss Acker carried it to extremes. Los Angeles tells us she was a very insecure woman; a chronic psychotherapy jumper. She'd try one kind of therapy for a while, drop it, and go on to another. The insecurity wasn't unusual considering her parents abandoned her when she was around ten or eleven.

"The unusual part was that she didn't seem to seriously want to be cured. The few doctors who'd talked to the men LA sent around said that as soon as she started to make progress, she'd quit." Arneaux shook his head. "Rumor has it that she needed to continually prove she was attractive to men. She'd take off and disappear for a week or more, then suddenly reappear in some city halfway around the world. We confirmed one rumor with New York and another with Rome. It was hushed up, but several years ago she was arrested

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in both cities for prostitution. I'm guessing she came here because Luna has no laws prohibiting sex for cash and few regulations other than those covering a hooker who causes trouble—either medically or any other way. We know she arrived ten days ago, traveling under her real name, disguised with a dye job to make her hair its natural color and a set of contact lenses to conceal her rather famous tawny yellow eyes." Arneaux tapped on the other folders in the pile and went on, "According to witnesses—bartenders, other ladies of similar persuasion, et cetera—she started working the spigots the same night she arrived. She was, again according to our sources, quite successful. She never worked the same spigot twice and, as far as we know, never took on the same man twice, or more than one man at a time. *No* combinations of any sort. Ribicov was her second customer on the last night she was seen. Nobody saw her afterwards, although Ribicov was seen in several places later that evening." Arneaux laid the stack on Debbie's desk, shrugged, and said, "And that, Captain, is about the extent of what we know to date.

"Oh yes, one other fact, Captain. According to our customs records, this was the third time she'd traveled to Luna under the name of Millicent Acker; so it's hard to tell *whom* she knew on Luna."

"Well," Debbie sighed, "maybe Mr. Button can tell us more. Being her agent, he should know her fairly well. Send him in."

"Sit down, Mr. Button," Debbie told the agent when Arneaux had shown him in.

For a second the man hesitated, seeming to glance about the room in puzzlement, then he chuckled and seated himself. "Boo*ton*," Capitaine. Zjhaan Boo*ton*," the agent corrected.

Debbie glanced at the card the agent handed her, it read Jean Buton, Theatrical Agent, and gave his address and phone number. A very posh section of West Los Angeles, Debbie noted. "My apologies, Mr. Buton. I didn't realize you were French."

"New Orleans, Capitaine. Cajun French, if you will."

The man was blond, fortyish, well built and tanned—handsome in a prepackaged way. His voice was a pleasant baritone with undertones of amusement and tolerance for people mispronouncing his name. Debbie wondered why she felt an instinctive animosity toward him. Probably his ostentatious *poor Cajun made good* address and faintly patronizing manner, she decided. "I understand you've come to see to the arrangements for Miss Acker," Debbie opened bluntly.

"Oui, Madame Capitaine," Buton acknowledged. "A great tragedy. To the artistic community, a great loss, as well—for me, one most personal. It is most disturbing."

"Personal, Mr. Buton? Would you care to elaborate on that? I understood Miss Acker was merely your client."

"She was that, indeed, Capitaine. But I also loved her very much. Once, we were man and wife, and for her I still had great feelings."

Debbie glanced back at her notes and questioned, "I understood her ex-husband's name was Jack Starret. Am I missing something?"

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"As my ex-wife used Loreli Candle for a stage name, I was once Jack Starret. For a while, I played at being the heroic actor." Buton laughed, "I was truly awful, I am afraid. There are only so many roles that call for French pirates or the Three Musketeers. I soon learned that if I was not to starve or live on Loreli's beneficence, I would have to find another profession. Loreli became disenchanted with her manager at that time, and I took over her management until she could find one more in tune with her ambitions and temperament. I proved to have a talent for management and became, under my own name, a professional representative of artists. It has been most successful, and I owe it all to Loreli."

Debbie asked, "If it was so successful, why did you get a divorce?"

Buton shrugged, "What is success in business, is often not a viable basis for romance. Loreli . . . How shall I put it? She needed more encouragement, more assurance that she was truly beautiful and talented than I alone could give her. I understood, and though it broke my heart, I let her go."

Broke your heart, my little toe, Debbie thought. She recognized Buton's type from her years on the LAPD. The only thing that would really break Buton's heart, she decided, was a flat bank book. "I imagine Miss Acker's death will be a bit of a financial inconvenience to your agency?" Debbie remarked in a casual voice.

"Oui, Madame Capitaine. It will be. Loreli was the star of stars in my clientele. Her loss will not break me, but it will be an . . . ah . . . inconvenience, certainly. To be honest, she was scheduled to begin taping a series next week which would have made us both a large sum. A very large sum."

I can believe that, Debbie thought —almost. Why isn't this man convincing me? she wondered. What does he know that he's withholding?

"Mr. Buton, were you aware of the . . . ah . . . forms of recreation Miss Acker indulged in on her . . . vacations?"

"Oui. I was. It was the bane of our relationship, to be truthful. It has cost me much to keep her little escapades a private matter. If they had ever become public—" Buton gave a typically Gallic gesture, hands thrown wide, and went on, "Poof! Her career would have been over. The great public will only allow their idols so much in the way of scandal. Loreli often exceeded those limits. I tried to get her to stop, to get professional help—" Again the Gallic shrug, "It was no use. Sex, of the . . . ah . . . professional kid was her personal drug. It gave her the confidence in her attractiveness to go on. The most I could do was keep it secret."

Buton was telling Debbie little that she didn't already know, beyond the fact that he had once been her husband. Hmmm, she wondered . . . "Mr. Buton, I assume you had some form of insurance, professional if not personal, on Miss Acker. May I ask what it was?"

Buton looked as if he'd swallowed something intensely bitter. "Unfortunately, no," he admitted. "The studio had a policy on her, of course, to protect their investment in any film or program she was working on. But I, personally, did not."

Which is breaking your heart, Debbie

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thought. Ah well . . . "I think you've told me all I need at the moment, Mr. Buton."

"Please, Madame Capitaine. If I may be of any help—"

Debbie nodded and quietly pressed the button to summon Arneaux. "Let Lieutenant Arneaux know where you'll be staying. If anything arises on which you might be of help, I'll certainly let you know." She paused then asked, "How long *will* you be staying, Mr. Buton?"

Buton shrugged apologetically, "I don't know exactly, Capitaine. As long as it takes to make all the arrangements . . . perhaps two or three days."

Debbie smiled noncommittally and dismissed Buton with, "Thank you for your help, Mr. Buton. Lieutenant Arneaux will show you out."

Debbie watched Buton leave with a vague feeling of distaste for the man. As he reached the hall, and the door began to close behind him, Debbie saw the muscles of his shoulders relax and an almost triumphant breath inflate his chest. Now what in hell was that for, she wondered? She stared at the closed door for a long time before deciding, I think I'd like to know a lot more about Mr. Jean Buton. Something is not at all on the true and green there. She reached out and punched the buttons which summoned Arneaux and Malloy.

"Gentlemen," she told them when they arrived, "I want to know everything you can find out about Mr. Jean Buton—and put a tail, a discreet one, on him while he is on Luna. There's something not right there."

Arneaux's eyebrows went up several

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millimeters. "You think Buton may be involved in these murders?"

"No," Debbie answered. "I don't see how he could be. He's only been here a day at the most. But he knows something he's not telling, and it could be important. I want to find out what it is." She sighed. "And I guess I'd better call my father, I may need his help after all."

The next morning Debbie Leeds, née Mckenzie, faced Douglas Arthur Mckenzie, Uncle Jim Hardt, and her husband across the desk.

Her father was addressing her husband. "See, Son, I told you my daughter knew her poor old father had some good years left."

Uncle Jim grinned and commented, "It's a useless argument, Doug. I've been trying to convince my nephew of that for years, and all I get is accusations of manipulation and interference."

Douglass Mckenzie nodded with sad solemnity, "True, Jim. Too true. They're an ungrateful lot, the modern children."

"If this mutual commiseration society can adjourn for a moment," Debbie interrupted with amused exasperation, "I do have a problem that you two sad ancients may be able to help me with."

"Well, speak up, Daughter," her father said placidly. "If you don't tell us what it is, we can't help."

Debbie took a moment to bury her face in her hands and let out with a not so silent, "Aarrrgh."

Jim Leeds immediately sprang to his wife's support: he laughed. Then rapidly ducked as she suddenly shied a wad of paper in his direction.

"Next time it'll be something heavier," she warned.

"Yes, dear," Jim Leeds grinned.

Debbie chuckled, then began, "I need to know everything I can find out about Millicent Acker, alias Loreli Candle and her agent/ex-husband Jean Buton, alias Jack Starret. What project they were working on, what their standing in the industry was—their real standing, not the advertised one—and what kind of money their investments, wills, et cetera represent. I also want a detailed track of their movements over the last few years. Something stinks to high heaven about that pair, and her murder is possibly the least of it.

"Pop, you and Mom are heading home next week. You can find out a lot on Terra that I can't; and Uncle Jim, you can pull political strings to get Pop information sources that might otherwise be closed to him." She studied her father and uncle-in-law. "Will you do it?"

"Of course," they chorused. Her father adding, "It'll be a blast. I've got a few people I've been wanting to shake something out of for years. This'll give me a good reason."

"Ditto!" Uncle Jim seconded. "If it can be found, we should have it within . . ." he glanced at the senior Mckenzie, "say . . . two weeks."

Douglass Mckenzie nodded in agreement and opened his mouth to speak. The beeper on Debbie's console interrupted him.

"Captain Mckenzie," a nervous patrolman on the other end said when she answered, "Sergeant Malloy asked me to tell you that he's located Ribicov and should have him in your office within the hour . . . and Captain, I just got a call from the West Lock . . . I'm afraid

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we have another woman's body in a bag."

"My God!" Uncle Jim spluttered, "Three weeks, three bodies. What is this, Murder Incorporated's version of a fast food franchise?"

"Grotesque, but apt," Douglass Mckenzie nodded. "Kill 'em, bag 'em, and ship 'em out. One murder to go, please."

5

Vassily Ribicov was slender, short by Debbie's standards—barely 140 cm.—but still tall for a man who spends his professional life slipping in and out of the often narrow caves and fissures on Luna, searcing for valuable minerals. He had dark hair, clear greenish eyes, and looks that Debbie classed as adventurous rather than stylishly handsome. He was the kind of man women are attracted to despite their better judgement. He was also very nervous. Tiny beads of moisture glittered in the hairline along his forehead. Debbie discounted his nervousness. Any man who finds out he was the last person to be seen with a murder victim tends to be slightly upset when the police decide to talk to him.

"There's no need to be nervous, Mr. Ribicov," Debbie told him soothingly.

"I'm not nervous, Ma'am," Ribicov told her, then added with a slight smile, "I'm scared shitless."

Debbie laughed despite herself at the brash honesty. "At least you don't make any bones about it. And if it will make you feel easier, I'll tell you at the start, you're not a serious suspect. All the data I've looked at says you aren't the cold-blooded, premeditated killer type—not even the passionate type. You might kill in self defense, but that's about all. You have a reputation for walking away from trouble, not charging into it. My main reason for wanting to talk to you is to find out what you may have seen that can point us to the real killer."

Ribicov relaxed noticeably. "I'll tell you what I can, Ma'am. But I just don't think I know much."

"Do you know who your companion was?" Debbie asked.

Ribicov shivered. "I do now. It makes no sense at all to me either. I mean, what was a famous actress pop-shopping for in the first place? Judas! She could have had almost any man in the System just for the asking."

"Apparently," Debbie answered, "she needed to be wanted for herself rather than for who and what she was. Pop-shopping was her admittedly unusual way of fulfilling that need."

"Ummm," Ribicov commented as he thought about what Debbie had just told him. "Makes a weird kind of sense, when you think about it. It also explains a few things."

"Such as?"

"She didn't react like the usual Spigot Susie . . . uh . . . in bed, I mean." Ribicov blushed slightly, but went on when Debbie nodded. "She seemed to really enjoy what we were doing. No fancy stuff, just plain old love-making. I felt she was getting as much or more pleasure out of it than I was. You don't get that with the usual play for pay girls. They may try to fake it, and they may be good—but you can tell. Also, a professional will try to add you to her regular clientele if she likes you, some-

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times even if she doesn't. Millie—that's what she told me her name was."

"That was her real name," Debbie said in the pause, "Millicent Acker."

Ribicov nodded. "I kinda thought it might be. Well, Millie did the opposite. I tried to make another appointment, and she flat told me she never repeated with a customer."

Debbie nodded. "That fits our information. She apparently never did. Once was enough for her needs. She was probably afraid she might be recognized if she repeated. Now you may begin to see why I need your help. There are still a lot of unanswered questions."

"Weird or not, she was too nice a lady to end up like that. I'll help if I can. What do you want to know?"

"First," Debbie asked, "how long did you two spend together, and where did you go?"

"I live in that area, when I'm in town." Ribivoc chuckled nervously. "Which you obviously already know. Anyway, we went to my place." He paused, the effort of trying to remember written plainly on his face. "How long is a little harder. I'm not real sure what time we left the spigot. But, she left me around oh one hundred." Ribicov gave Debbie a wry smile. "Took my money, patted me on the cheek, told me what a sweet guy I was and walked out the door."

"That was the last you saw of her?"

"More or less. I watched her from the window. Until she picked up another customer."

Debbie suddenly became all attention. "You live in a pretty much residential neighborhood, don't you? Isn't it a little unusual for a hooker to pick up another customer on that street?" Ribicov considered the matter for a long moment, then said slowly, "Yeah, now that you mention it, it is. Pop-shoppers generally run the spigots, not the back streets, and that's where you'd look for them. Come to think if it, the way she reacted to the guy was a little odd, too."

"Odd how, Mr. Ribicov?" Debbie pressed.

"Well, she seemed to know the guy. They stood on the curb and talked for quite a while, like they were arguing, sort of, before she left with him. At first I thought it was a former customer looking for a rematch, but she didn't seem to react that way either. I couldn't see her face, but the way she stood looked tense—like the guy was someone she knew and really didn't expect, or want to meet. Weird too, I thought he looked familiar, like someone I'd seen in one of the spigots maybe."

Debbie could smell and taste a break; her voice had a hunter's ring in it as she asked, "Did you get a good look at the man—it was a man, wasn't it?"

"I'd say so," Ribicov chuckled in spite of himself, "or the ugliest woman I've seen in a long time." He paused, thought for a moment, then began to describe the man he'd seen. "Gray hair, long, mod cut. Medium build. Sort of a squat, jowly face. I couldn't see eye-color or complexion under the lights, or hear his voice, but he seemed to walk with a slight limp. Carried a cane, in fact."

Deep in Debbie's mind a memory box opened with a loud click. Her mind framed a picture of a gray-haired, jowly man waving a cane. She dug into the drawer of her desk, found the data cube

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Uncle Jim had left, and plugged it into her desk terminal. She quickly ran through the record until she found a good picture of Councilman Scithers, enlarged the frame until Scithers's figure filled the screen, used a screen pen to delete the surrounding details of the council chamber, and swung the screen around. "Could it have been this man?"

Ribicov studied the picture for a while, then shrugged and shook his head. "I wish I could say yes, Captain. But I'm just not sure; the build and face look about right, but they were a good ways off, and a street lamp can distort features. Best I can give you is a maybe." Debbie leaned back in her chair with a satisfied sigh. She'd gotten more than she'd hoped for. Now if the bartender—what was his name?—could give a more positive ID, or even a comparable one, she might have her first solid lead. "Thank you, Mr. Ribicov. You've been a great help. Would you mind staying in town for a few days, or if you can't, letting my office know where we can find you? I may need you to look at more pictures." When Ribicov hesitated, Debbie reassured him, "Any information you give concerning your location will be strictly confidential, and I *personally* will make sure that any data on your prospecting locations are erased once they are no longer needed by my office."

Ribicov stood and nodded slowly, "Will do, Captain. Milly deserves at least that much." When Ribicov had gone, Debbie called Arneaux to see if he'd returned from the site. She'd decided, in view of the lack of pertinent clues at the previous sites, that she'd let Arneaux and Malloy handle this location while she interviewed Ribicov. It was also time, she realized, to break her tendency to try doing the whole job alone. Police work is a team effort, she reminded herself, not a one man show. You're trying to catch a murderer, she said to herself—not play super-cop.

When Arneaux answered he was still at the site, and she asked, "What have we found out so far about our latest victim, Simon?"

"A lot and not much, Captain. The coroner did a fast print scan on the site and came up with an ID. Girl's name was Donny Frie; that's all we know about her so far. We don't even have a current address, so I'm betting she's another pop-shopper. One thing of interest, though: the coroner thinks she's been dead and exposed on the Lunar surface for at least three weeks. Based on the condition of the other two victims and some comparative tests he's run, he's sure the desiccation of this girl's body is too great for the time to have been much less, and not enough for it to have been much longer. Put it between three and four weeks."

"Well—I'll—be—damned," Debbie breathed. "Simon, if you can, have Bernie finish the site and follow up on the investigation. I need you back here; we may have a solid lead, and it may be hotter than all hell politically."

Arneaux gave his boss a startled look and agreed, "I'm on my way, Captain."

Before he could cut off, Debbie stopped him. "And, Simon. Since that girl has been out there for a while, maybe we'd better arrange for a detailed search of the area surrounding Darkside.

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Concentrate on tourist areas, camp sites, and relatively well traveled routes first."

"You think there may be more, Captain?"

"Call it a hunch, Simon," Debbie said, her face set in grim lines, "but I'd bet on it."

"I'll set it up immediately, Captain. Arneaux out."

Debbie cleared her comm screen and hunched herself deep into her chair, lost in concentration.

She was still buried in her thoughts when the secretary temporarily assigned to her opened the door of her office and announced her husband. Debbie jumped slightly, cursed the woman silently and wished she had Mae here. Mae wouldn't let Jesus Christ Himself into Debbie's office without buzzing her first. Once Leeds, having just talked to his then-fiancée on the comm and knowing Debbie was alone, had unthinkingly tried to walk past Mae; it hadn't worked. Director of Lunar Security or not, Mae had made him wait till she checked with Debbie; then, and only then, did she open the door. Debbie wondered if it would be possible, or diplomatic, to bring Mae over from Luna City if this case ran on much longer.

Jim Leeds interrupted her thoughts. He bent and kissed her soundly before asking, "How's it going, sweetheart?"

"Bloody awful, if you really want to know. I have a tentative identification of a man who picked up Millicent Acker after she'd left Ribicov. An ID which also tallies in some respects with the one the bartender gave us of Helen Orvis's last known contact."

"That's great!" Jim Leeds exclaimed, then damped his enthusiasm and asked, "Or is it? Why would it not be?"

"Because the identification may point a very accusing finger at Councilman Scithers."

Jim Leeds looked stunned and lowered himself into a chair as if he thought it was going to snap at him. "It implicates Old Sword of the Lord?"

"It would seem to," Debbie confirmed. "If we get any corroborating descriptions from other witnesses about the last contacts of our latest victim, I think . . . no . . . I'm *afraid* I'm going to have to talk to the councilman. And I think you and Uncle Jim should be present if I do."

"So do I," Jim Leeds agreed. "Accusing a councilman of being involved in a multiple murder would be no joke under the best conditions . . . and with an explosive, half-nuts character like Scithers . . ." Leeds let his statement trail off, then added, "It isn't something I'm going to look forward to. The political stink that old pain in the butt could create if we're wrong, and he's not implicated, might be a real rock popper's nightmare."

Debbie agreed emphatically. "The first thing we need to do is see if we can find anyone else who can corroborate what we've got so far. Also, we need to see if we can track our latest victim's movements—although, I doubt that we'll get much more than we did on the others." Debbie became thoughtful. "Then we might want to talk to Councilman Scithers anyway. Even if he isn't involved, someone may be trying to make it look like he is."

"I never thought of that," Leeds said. "He's certainly unpopular enough

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in some quarters for someone to try framing him for something. But multiple murders? A bit extreme, wouldn't you say?"

Debbie shook her head. "I doubt that the real motive behind these killings is to frame Councilman Scithers. It looks more and more like the work of a madman."

"Scithers has certainly jumped his trajectory—or acts like it," her husband agreed. "But homicidally so? Somehow I doubt it. And why pick on pop-shoppers? There are lots of targets he could take his fundamentalist frustrations out on, and *does* verbally, without committing homicide."

"If I could answer that last question," Debbie said, frustration showing in every syllable, "I'd probably know who the murderer is."

"Lieutenant Arneaux is here," the comm set announced.

"Good!" Debbie said. "Send him in please."

When Arneaux had joined them, Debbie told him. "Simon, I want you to get several pictures of Councilman Joshua Scithers and pictures of other people who match the general description of the person our victims were last seen with. Take them over to the bartender who gave you the description and see if he can pick anyone out. Also, you might want to have the people trying to track down Miss Frie's movements carry a set as well. If any of them gets a description that fits, have the witness try and pick someone out."

"Will do, Captain," Arneaux replied. "And, Captain, I got a search underway. Told them what you told me, and recommended they start in close and

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keep expanding outward." Arneaux paused, then said, "You know, Captain, There's something that's really been bothering me about this last victim."

"Which is?" Debbie asked.

"She was found near a very well traveled route—so well traveled that three reports of seeing the body came in within a few minutes of each other." Arneaux looked puzzled. "If she'd been out there for at least three weeks, why didn't someone spot her sooner? It's as if someone killed her weeks ago, stashed it, then, just yesterday, moved the body to where we found it."

Debbie nodded. "I wondered that myself, Simon. That's why I ordered the search."

6

By the end of the week, Debbie had a few more links in her chain of evidence, and her worst fears had been confirmed. Two additional bodies had been found.

". . . Penny Ching and Paulette Savoin," Arneaux reported. "Both popshoppers. They disappeared about seven months ago. The coroner's report confirms that they've both been dead and exposed to the surface approximately that long." Arneaux hesitated, then said, "I doubt we'll get any reliable witness from that long ago, but we're checking."

"I doubt it too," Debbie agreed. "What about tracing those polymer bags? Any luck there?"

Arneaux shrugged. "The lab found traces of wheat flour in all of them. They traced it back to a mill in Asimov; from that point, we've got as much chance of tracing it as walking to Jupiter. The mill supplies thirty-five bakeries and restaurants in Darkside alone. Most of those places toss the empty bags in boxes and stack them behind their places to be picked up. Anyone could have slipped in while the boxes were awaiting pickup and walked off with a few bags—even a whole box. It happens all the time, but the things are so cheap nobody cares. We're doing better with the pictures. No less that fifteen people have picked Councilman Scithers out of the pile as being the last person they saw with either Helen Orvis or Donny Frie."

Debbie sighed, "I was afraid of that. It looks like it's time to have a chat with the good councilman."

Arneaux nodded. "Looks like, but what still puzzles me is if these girls—the last three anyway—were killed from three weeks to seven months ago, why are we just finding the bodies now? All of them have been in locations where they should have been discovered a long time ago. It looks like they were killed, stashed somewhere else, then dropped where they'd be found only recently. And that doesn't make much sense at all to me."

Debbie shivered. "It does if we're dealing with a psychotic, Simon. A psychotic, no matter how warped his motivations, needs to be recognized. At first, fear of being detected may have made him hide the victims. Or, he may have put them someplace he could safely return to and gloat over his handiwork. Then, possibly with Helen Orvis, and perhaps also with Millicent Acker, he didn't have time to hide the body in his usual location—he just had

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to get rid of it. When the body was discovered, and no one came knocking on his door, he decided he wanted public recognition—or enjoyed watching us chase our tails—and started putting the other bodies where they could be found."

"Sounds logical, Captain—in a sick sort of way," Arneaux agreed.

"Sick is what we're dealing with, I'm afraid, Simon," Debbie confirmed. "I just wish I knew in exactly what way he's sick. Why is he picking on popshoppers—or in the case of Millicent Acker—a talented amateur? Does he have a grudge against hookers, or does he hate *all* women—and hookers are just safe, easily available women to take his hate out on?"

"A lot of ifs and whys, Captain," Arneaux remarked.

Debbie tapped her fingers against the surface of her desk, letting her frustration flow from soul to plastiwood with each jarring click. "Tell me about it, Simon. Tell me about it."

After a while, she said, "Simon, I think Darkside is going to be a dead end. Keep the boys working on tracing the movement of these latest victims, and keep someone checking to make sure no more turn up. As for us . . . let's move this show back to Luna City. It's time to talk to the councilman, and I'd rather do it in my own office than drag Scithers here to Darkside. He's going to be in a bad enough mood when we call him in as it is."

"I'll get started right away, Captain. We can be back in Luna City this evening."

"Thanks, Simon," Debbie told him and gave him a tired smile. "If anyone ever tells you I could get anything done without your help—call him a liar."

"Captain," Arneaux grinned from the door, "you could get the job done with a magnifying glass and a hairpin, but I sure appreciate the compliment."

Debbie grinned in return and said, "Mutual admiration is a great thing, Simon, but this is getting ridiculous. Now git. I've got work to do."

When Arneaux had gone, Debbie began planning her approach to the interview with Councilman Old Sword of the Lord Abraham Joshua Scithers.

7

James Hardt parked himself on the corner of Councilman Scithers's desk, drawing an irritated look from the desk's owner. Scithers's chair creaked loudly as he leaned back and peered at Hardt. He rocked the chair slightly for a few seconds to keep up the sound. It was, he felt, a minor triumph of obnoxious distraction. He enjoyed the fingernails-on-slate effect it had on visitors he didn't like.

It apparently had no effect whatsoever on Uncle Jim. At least none that Scithers could see. Hardt simply sat and waited with a slight smile on his lips.

Scithers brought the screeching chair to a disgusted halt and said, "You'd never come here for pleasure, Hardt. What do you want? If it's support for some muddleheaded liberal bill, forget it."

"Well, it's like this—"

"You can dispense with the obfuscations and ambiguities," Scithers snapped. "Make your statement and get out. I've got no time for nonsense."

"Agreed," Hardt stated in a flat

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voice. "Diplomacy has no place in murder."

The statement blindsided Scithers. He stared at Uncle Jim angrily, his jaw working in short spasmodic motions. He made tiny abrupt bouncing motions in his chair, causing it to imitate the sounds of a family of disturbed mice. "What do you mean, murder, Hardt? Is this your idea of a joke?"

Uncle Jim remained placidly seated on the corner of Scithers' desk, waiting for Scithers to settle down. Finally he said, "No, it's not a joke, Abe." Scithers winced at Hardt's use of a nickname he detested. Hardt noted the wince, reminded himself that gloating wasn't nice, even if he did think the person was a four square idiot, and continued, "Sorry to have to tell you this, but that little tirade of yours in Council a couple of weeks ago—the one about wasting the taxpayers' money chasing whoever dumped the working ladies—may have put you in a very awkward position."

"I expected persecution," Scithers intoned, getting a good start on a major diatribe.

"Not persecution, Abe," Hardt cut him off. "Prosecution."

Scithers was beginning to feel like the quarterback on a high school football team playing the Superbowl winner. Every time he thought he was getting a good start, someone sacked him. "Prosecution!? What in heaven's name are you talking about, Hardt? Since when do speeches warrant prosecution?"

"Speeches don't, Abe. Murder does. Several witnesses described a man who looked like you as the last person those girls were seen with. They also picked your picture out of a stack of similar men." Hardt shrugged at the goggling Scithers and concluded. "Upshot is that Debbie Leeds would like to talk to you in her office as soon as possible. Like now."

"I may not object when someone removes such scum as those women were from Luna," Scithers said coldly. "I may even think that the person is doing the Lord's handiwork. But, I follow the law Our Lord, God, laid down for us all—especially the Ten Commandments—I do not commit murder. No one in their right mind could even think such a thing."

"Be as that may," Uncle Jim shrugged, "my niece-in-law and her husband would like to hold converse with you."

Scithers retreated into the classic refuge of the inadequate—sullen defiance. "If they want to talk to me, tell them to come here. A member of the Lunar Council is not someone to peremptorily summon."

Hardt grinned nastily. "That's why *I* came instead of a couple of armed officers with handcuffs," he told Scithers. "In a murder investigation, it's the prerogative of the investigator to pick the place to talk, not the suspect." Hardt softened his look a bit and continued, "Personally, I don't think you've committed any crime worse than opening your big mouth at the wrong time. If you haven't, then Captain Leeds will find that out. Also, if you haven't done anything to be worried about, then it would be interesting to know why the person we're looking for bears such a striking resemblance to you. Coincidence? Or is someone trying to frame

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you? I'd think you'd like to know that yourself."

Scithers gave Hardt a glare of pure hate, but said, "You may be a thorn in the side of Holy Justice, Hardt—but you do know how to make a point. Let me clear my calendar, and I'll accompany you."

Hardt lit a cigar, which he knew Scithers detested, moved to a chair, settled himself and said casually, "I'll wait."

"I judged you would," Scithers snapped and went about the task of rescheduling his afternoon.

". . . ridiculous, Captain Leeds!" Scithers huffed at Debbie. "This whole affair is utterly ridiculous."

"I do *not* consider murder ridiculous, Councilman," Debbie said coldly. "Not ever. Neither do I consider the profession of the victim when I search for a killer. If the act was justified, that is for a court to decide. Not the police."

"I meant my being implicated in this at all," Scithers snapped.

"Councilman, may I remind you that, to a large part, you implicated yourself."

"Captain Leeds," Scithers puffed himself up like an oversized frog in search of romance, "Your phrasing is trite, and I have heard all this before. Speaking the truth of Our Lord is not grounds for arrest on Luna." He gave them a bellicose stare, adding, "Not yet, at any rate."

Debbie was more amused than disturbed by Scithers's pomposities. She replied calmly, "Nor will it ever be if I have anything to say, Councilman. Nor will a person's color, race, political beliefs, or," she added the barb to her hook, "their occupations, as long as they violate no law. My sole concern in this is to find a murderer who is possibly a psychotic. A psychotic who, in his irrationality, may decide that Council members, or even ministers, may be more deserving of his attentions than ladies of the evening."

"Then why aren't you doing it, Captain? Why are you spending time harassing me?" Scithers snarled.

Debbie smiled calmly and informed him, "Because finding out who did not commit the murders is part of the process of discovering who did. You have been identified, perhaps erroneously, as being the last person seen with three of these women."

"What do you mean *perhaps?*" Scithers grated. "Of course the identification was erroneous!"

Debbie smiled sweetly and leveled a verbal slap at Scithers that stifled any further protests. "That," she said, "is what we are trying to establish at this exact moment, Councilman."

Scithers may have been set back, but Council members are noted for their swift recoveries. "Then let's get on with it," he grumped.

"Fine," Debbie stated politely. "Now, Councilman. The first thing we need to find out is where you were at the time a person resembling you was known to be with the victims." She handed Scithers a typed list giving the times. "Also, a reasonably detailed account of your movements, and people who can corroborate them, would be of immense help in eliminating you as a suspect."

Scithers stared at Debbie with a look

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that was a mixture of disbelief, anger, resentment, and religious fervor. He said slowly, anger predominating in his tone, "Are you saying that you hold the least suspicion that I *might* actually have had something to do with this?"

"Certainly, Councilman," Debbie told him in a surprised tone. "I suspect *everyone* who matches the descriptions I have and who can't account for their whereabouts."

Debbie's calm, honest statement deflated Scithers considerably. The realization that he was being seriously considered for the starring role in a murder trial, a fact which, until then, hadn't really sunk in, sobered him considerably. He scanned the list and said slowly, "I'll have my secretary send you a list of my appointments and movements." He gave Uncle Jim a wry look. "My honorable opponent here can account for quite a bit of it." An unsuspected touch of humor showed in his personality as he added, "We do tend to spend quite a bit of time together, no matter how reluctant our association may be." His face became grim again and he tapped the typed list of times and dates as he concluded, "I think I can tell you, though, that I can't prove where I was on these evenings. I live alone and entertain few guests. I'm quite sure I was at home, alone, and probably asleep during the times you have listed." He shrugged. "I'll get the rest to you as quickly as possible."

"I can't ask for more, Councilman. I thank you for your time."

Scithers nodded, rose, and walked to the door. As he reached it Debbie's voice halted him. "Councilman, one further thing. I do not believe in coincidence. The descriptions given by our witnesses are too precise to be ignored. If you are not involved, then someone is going to a great deal of trouble to make it appear as if you are. I will not force a bodyguard on you, but it might be safer if you acquired one. It is not impossible that the purpose of this whole brutal mess is to get you tried and executed for murder; if our killer decides he's failed to remove you one way, he may try another, more direct approach."

It was a concept Scithers hadn't considered before. He nodded and agreed, "I'll discuss it with the Council's Chief of Security." Again the wry sense of humor showed. "It will also make your job easier," Scithers informed the group. "You won't have to waste manpower keeping me under surveillance."

You'll be under surveillance anyway, Debbie thought, but thanks for the consideration. Aloud she replied, "Thank you, Councilman. It is most understanding and considerate of you."

Scithers gave a sour, "Hmmph," and disappeared through the door. He didn't bother to close it behind him.

"He may be a religious fanatic," Uncle Jim commented when Scithers had gone, "but I don't think he's our killer. He's just not the type."

"You may be right, Uncle Jim," Debbie conceded skeptically, "but, if history is correct, Jack the Ripper was a fine surgeon and loved dogs and children too. He still managed to do in quite a few of London's late-night ladies." Debbie folded her hands and leaned her elbows on her desk. "Right now, Councilman Scithers is our number-one sus-

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pect . . . if for no other reason than he's the only one we've got."

She studied Uncle Jim and her husband and finished, "So let's find some more, shall we?"

When Leeds and Uncle Jim had left to get back to their own work, Debbie stared at the wall and went over the interview in her mind. She tended to agree with Uncle Jim. Scithers had behaved as an angry councilman, not a scared killer. He'd even smelled angry. "But then again, if he was insane, would he be frightened by the police?" She shivered. If he was, would the councilman even know if he *had* committed the murders? God, how she hated this kind of case. She picked up the top folder from the stack on her desk and started going over it for the hundredth time, hoping to find something she'd missed. As she reviewed the data on each of the victims, a vague, only half formed thought began to pick at her consciousness: did the killer kill those easily available ladies because they were "available ladies," or because they were easily available? Debbie filed the thought for further consideration and went back to her reading.

8

A week and a half later, the case was still stalled. No further bodies had been discovered, nor had any other suspects. Debbie was beginning to have nightmares in which she was being buried in polymer wrapped bodies while a figure she couldn't identify, but who was dressed in a chef's outfit, laughed in the background and shouted in a pulpit-trained, stained-glass-window-rattling voice, "Another pop-shopper to go for

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God!" All the packaged women were struggling and screaming at her in terror, "Save me, saveme, saaaveme!" as their faces turned blue and their tongues began to protrude; and Debbie couldn't move for the press of their bodies. She was helpless to rescue them because they pinioned her. She smelled the sour breath of their fear as their thrashing forms buried her, the sweat of her own fear turning the bedclothes cold and clammy.

Two things happened to free Debbie of her nightmares.

"Hey Uncle Jim!" The tall, lanky smartblade driver slid out of the noise and smoke-haze of Henry's Happy Time and into a seat opposite Uncle Jim. "You look about dry, not to mention unhappy. Can I buy you one to cheer you up?"

Uncle Jim grinned at the offerer. "Never been known to turn down a free beer, James. Where's Gertrude?"

"Bringing the beer, of course, Uncle Jim," a pleasant contralto informed him. Jim Carter's red-haired companion slid into a vacant seat, put down the three steins and leaned across to kiss Uncle Jim thoroughly. "How have you been? You look terrible? Latest girlfriend toss you out for a tennis pro?"

"James, does this beautiful bio-analog have an off switch anywhere?"

Jim Carter chuckled, "Not that I've found, Uncle Jim. And believe, me I've looked—most thoroughly."

"Hmmph," Gertrude sniffed. "That's not what you told me you were looking for. I should have listened to my builder. Never believe a man, she told me. She was right."

Uncle Jim laughed, "Good advice, Gertrude. Now, what have you two been up to for the last couple of months?"

"Digging holes out near Darkside," Carter replied. "Usual stuff. Only excitement was that mess with the murders. Which reminds me. Gert and I saw one of those girls . . . uh . . . the one named Donny with the guy you've been describing."

"Judas!" Uncle Jim said. "Why didn't you say something?"

"Huh? We did. Gave our statement to one of the Security boys."

"Yes," Uncle Jim said, "but Gertrude's memory is a lot more reliable than a human's."

"At least I'm appreciated for something." Gertrude smiled.

"I appreciate other parts of you too, Gert," Carter assured her.

"So I've noticed," Gertrude giggled.

"Well what did he look like?" Uncle Jim pressed.

"A lot like Councilman Scithers. Enough to be his brother, in fact," Carter said.

"But it wasn't the councilman," Gertrude added.

"How can you be so sure?" Uncle Jim asked.

"Easy," Gertrude said smugly. "It wasn't Scithers's voice. I've got all kinds of recordings of his rantings from Council session broadcasts. The voice print of the man that girl was with when we saw her wasn't even remotely like Scithers's."

Uncle Jim goggled. "I'll—be—damned," he said very slowly. "Gertrude, can you give me a printout and a data cube copy of the voice you've got stored?"

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Gertrude seemed a bit surprised. "Of course, Uncle Jim. What terminal do you want it on?" She added, "I can give you a video of him too, plain print or holo. We offered them to the officer we talked to, but he said if they were needed, someone would get in touch with us. Just tell me what device you want it sent to and the access number."

Uncle Jim buried his face in his hands and muttered. "For weeks we've been chasing our tails, and all the time we had recordings and pictures of the guy available for the asking. I do not believe the way the universe works sometimes." He picked up his stein and raised it. "A toast to the great god Murphy, who keeps things interesting —whether *we* like it or not."

Toast offered and drunk, Uncle Jim gave Gertrude the numbers and codes for his office terminal and watched while Gertrude seemed to think for a moment, then announced, "Data transferred, Uncle Jim. It's waiting for you on your own computer."

"James, Gertrude," Uncle Jim said with every ounce of sincerity he had, "You will never know how much I appreciate, and how much Debbie Leeds will appreciate what you've just given us. But it is a lot. If I can ever be of help to you, just let me know. Now, much as I hate to drink and run, I'd better get that stuff to Captain Leeds."

Debbie studied the voice prints and holos Uncle Jim had placed on her desk with more than a little awe. Both the man and his probable victim were clear. "How did you get these, Uncle Jim?"

"From a smartblade pilot by the name of James Carter and his computer, whom I've known casually for several years. They happened to be in the bar when this guy picked up Donnie Frie. What Gertrude sees and hears, she doesn't forget."

Debbie was confused and showed it. "I think you just lost me, Uncle Jim. Does this man Carter take his computer to bars with him? I thought they were permanently mounted in the machinery. And who's Gertrude?"

Uncle Jim chuckled. "I forget you haven't lived on Luna all your life, Debbie. Sorry. Gertrude is the bio-analog of the computer in Carter's blade. She looks, moves, and sounds just like a rather good looking, intelligent, redhaired human woman, but her thinking centers are all in the computer. The human-looking part is a biological robot that's remotely controlled by the computer in the blade. Not that anyone could tell. If you didn't know Gertrude was a biologic analog unit, you couldn't tell it from her behavior."

Debbie gave Uncle Jim a skeptical look. "You talk about it as if it is a human—or at least sentient—rather than a computer."

Uncle Jim shrugged. "A lot of the blade pilots whose computers have bio-analogs will swear they *are* alive. Me? I don't know one way or the other, but I wouldn't discount the possibility out of hand."

"Uncle Jim, that's silly," Debbie protested. "It's impossible for a computer to be alive. They don't operate on a real time basis. When their clock is in its off cycle, the computer is essentially dead. You can't be intelligent and die every nano-second or so."

Uncle Jim shook his head. "That's

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true of a digital computer. But, these aren't digital. They're analog hybrids that use synthetic DNA for memory storage. Just the same as we do. And an analog computer of sufficient complexity might develop self-aware intelligence. What the minimum complexity required might be, I haven't the vaguest idea—I'm a politician, not a computer specialist. So again I say, I don't know. But knowing Gertrude, I wouldn't reject the idea out of hand."

"Hmmm," Debbie said speculatively. "An intelligent computer could make a whale of a policeman . . . I'm going to have to meet this Gertrude one of these days."

"Now look who's recruiting," Uncle Jim laughed.

Debbie laughed in return, "This job does that to you. Now let's get back to the matter at hand." She gestured at the pictures, holos, and printouts on her desk and went on, "This tells us the Councilman Scithers isn't our man—but, accepting that as a fact, who is? Who is this man in the pictures? This," Debbie pointed at a computer analysis of the holograph before her, "says that the man is wearing makeup. Why is he dressed and made up to look like Scithers? And why is he killing these women in the first place?" Debbie flopped back in her chair and spread her arms wide in a gesture of total frustration. "Why, why, *why?*"

It took a call from her father to give Debbie her answers.

9

The call arrived the same afternoon, and Debbie answered it eagerly.

"I think I have what you wanted, Daughter," Mckenzie told Debbie when she answered.

"You were looking for someone with a motive. Mr. Buton seems to have it—for killing Loreli Candle at any rate. She was on a slide into oblivion as far as the Industry was concerned. Her looks were fading, and she didn't seem to be able to handle parts that called for more than a twitching body. That big role she was supposed to begin? A second rate series of cameo appearances on a low grade soap. Not exactly star billing.

"She was Buton's main source of income; his other clients are competent, but not much in the way of big money earners. Alive, she wasn't worth much in the way of future income. Murdered, her pictures are threatening to become a cult item. Also, it seems Buton had a fair piece of that soap opera production company—probably how she got the cameos in the first place. Any loss suffered by the company due to Loreli Candle's death—losses that the insurance company has to pay off on—is money in Buton's pocket. Not much in cash, but properly handled, her death could boost the ratings of the program."

"So how does her death really benefit Buton, Dad? All he'd get is his ten percent of the residuals, and maybe pocket change from the insurance money, and that would be that."

"The way Buton set up her contract, he gets his percentage of any residuals her estate receives. *Also,* although the estate itself isn't worth much—a couple hundred thousand credits max, which ain't much on today's market—those residuals could be a gold mine. And guess who inherits?"

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"Buton!" Debbie exclaimed.

Her father grinned. "You got it, Daughter—Mr. Jean Buton. The lady was an orphan, and after she and Buton were divorced, she never bothered to change her will since she didn't have anyone else to leave her stuff to."

"That gives him a motive, all right," Debbie agreed. "But how could he kill the lady when he didn't arrive on Luna until the week following her death?"

Mckenzie nodded and explained, "That's what I said, too. But I thought, maybe he hired it done. So I started checking. I got lucky, Daughter. I'd like to inflate my ego and say it was skill, but it was pure dumb luck."

Mckenzie shook his head in wonderment at the twists of fate which could hang or save a man. "I knew Buton was a Cajun, so I called a friend of mine in New Orleans and faxed him a picture of Buton and the data we had on Buton's family. Something clicked in my friend's memory. He told me to go get a cuppa while he dug through a bunch of files. I did, and he called me back in about an hour. Seems Little Johnny Buton was a rowdy kid, in and out of trouble from age ten on. But not under the name of Buton! Emile Buton, Jean Buton's legal father, was Mrs. Buton's second husband. Little Johnny Buton was born Jonathan Rosenstein. Seems Madame Buton had fallen for a handsome Jewish boy and married him when she was about eighteen. Little Johnny was the result of their stormy union. Neither did Buton lose contact with his real father. The divorce was amiable, as such things go, and Buton spent at least two months of every year with his father and younger half-brother in New York.

"My friend had arrested Buton, under the name of Rosenstein, on an aggravated assault charge way back when. I've included a photostat of the record, by the way. Buton had been seen arguing with a hooker in New Orleans, and the lady had decked him with her bag. Buton decked the lady in return, and *she* screamed for the cops. They hauled Buton in, but his stepfather bailed him out. Eventually the charges were dropped when the lady failed to show up in court to testify. Buton was a juvenile—seventeen—so the judge tossed the case out of court. My friend tried to find the lady involved—he didn't like Buton much—but she'd disappeared. He always suspected Buton had a hand in the disappearance, but never was able to prove anything."

Mckenzie shrugged. "It goes that way sometimes. Anyway, the heart of the matter is that by some lucky bureaucratic goof, Buton's rap sheet wasn't destroyed like a juvie's normally would be, but got put in the adult files. It contained the address and occupation of Buton's real father.

Out of curiosity, I started checking on the half-brother and father. The father is still in New York, quite a respectable businessman, but the half-brother—guess where he now lives."

"Luna," Debbie said with an awed shake of her head.

"Bullseye again, Daughter," Mckenzie chortled. "Darkside, Luna. His name's Walter Rosen. He seems to have dropped the *stein*—damned if I know why, but it probably isn't important. He's an engineer at one of the agricultural domes near Darkside. When I found that out, I did a little more

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checking on Mr. Buton's movements. Seems he disappears every now and then. I checked the passenger records for the Lunar flights and Orbital Station flights and discovered that Jonathan Rosenstein had been a frequent passenger over the past year on the orbital station flights. All with good reason, by the way; he and his brother hold interests in several businesses there. I've listed the dates on the sheet I'll transmit to you in a minute. You'll note that the elusive Mr. Rosenstein departed on the outbound orbital station flight a week and a half before Millicent Acker was found murdered. And, he returned the day after she was found."

Mckenzie smiled hugely at Debbie. "I've found you a motive and possibly the opportunity, Darling Daughter. All you have to do now is firm it up and prove he killed her."

Mckenzie frowned briefly and said, "By the way, I have no indication that this deal with Buton and Acker is related to the other killings at all. It may simply be a case of Buton's being an opportunist copy-cat. Buton may have knocked off his ex-wife for fun and profit and used the other deaths to confuse his tracks. It's your baby; you find out. I wouldn't want to take away all the challenge."

Debbie laughed at the expression of angelic innocence her father wore. "Of course you wouldn't. Besides, Mom wouldn't let you. She's not about to let you go kiting off to Luna. She's afraid you'd stay and drag her up here too, away from all her garden club cronies and her roses."

Mckenzie laughed in return. "How right you are, Daughter. Which reminds me, your mother sends her love and lots of hugs and kisses for both you and Jim. Now, Hook me up, and I'll transmit this pile of data to your computer so you can sort through it at your leisure."

"Done, Pop. And thanks. And give my love to Mom. Tell her I'll call her soonest."

While the data transferred, Debbie and her father exchanged normal father-daughter small talk, then signed off.

Debbie leaned back in her chair and stretched. Her face was set in a hard, angry smile. She snapped herself forward and made three comm calls. One to Buton's half-brother, one to customs and immigration, the last to a local vid-comm historian. When she was finished with the calls, she pressed the button for her secretary. "Mae, would you ask my husband, Lieutenant Arneaux, and Councilman Hardt to come to my office in . . . oh . . . about an hour. It would seem we've hooked ourselves a murderer, and I think I know just how to reel him in.

"When you have that arranged, get in contact with the central library and see if they have any films or vids with an actor named Jack Starret in them. I doubt if he'll be the star, but anything in which he has a speaking role will do. I've got a list here that may help."

"Right away, Debbie," her secretary replied. "While I'm thinking of it, do you want any coffee now? I know I'm going to have to make at least two pots for those coffee hounds, so I may as well kill this one."

"Love some, Mae. Thanks." When Mae had replenished Debbie's coffee and left, Debbie began to go over the information her father had sent her.

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Arneaux arrived fifteen minutes early, and Jim Leeds and Uncle Jim weren't far behind him. Debbie briefed them on the conversation with her father and the results of her calls to Buton's brother and Customs. When she'd finished, she looked at the men facing her. "I don't think there's much doubt that Buton murdered Millicent Acker, and had planned to do so for some time—at least for eight months. I'm fairly sure he also killed the others."

"I can see the motive for killing Acker," Jim Leeds said, "but why the others?"

"Concealment, obfuscation, misdirection," Debbie explained in a flat tone. "I wondered quite a while ago if the victims were chosen because of their profession or because of their availability. I'm fairly sure at this point it was the latter. A working girl could disappear and no one would ask too many questions about where she had gone. Especially if they were freelancers, and every one of those girls was. When the bodies started showing up, it was meant to look like the work of a maniac with a grudge against hookers. Buton—or Rosenstein—is a cold blooded calculating murderer. I suspect he murdered that hooker in New Orleans so that she couldn't testify against him.

"When Buton began to plan the murder of Acker, he knew he'd have to cover his tracks in some way because the motive of money—her estate—would certainly make him a prime suspect. He knew she traveled to Luna off and on, as well as other places, to indulge her need for sex that would build her self-confidence. Luna was safest. He even had a place to stay and a floater available. Buton's brother lives in Darkside, but often stays out at the dome where he works for weeks at a time. The brother uses a company vehicle, so Buton had free use of his brother's house and floater when the brother was away. Buton couldn't be sure *when* Millicent would try her luck in Darkside, but he knew there was a good chance that sooner or later she would. Even if she didn't, he could kill her and move the body to Darkside without too much risk.

"As I reconstruct it, seven or eight months ago, Buton, traveling under the name of Rosenstein—a name which he believed was unknown to anyone but his brother—made his first lethal excursion. On that trip, he picked up two hookers, Ching and Savoin, took them to his brother's empty house, drugged them, sealed them in bags, loaded them into the baggage hold of the floater, and stashed them someplace on the surface. He made another trip to Luna a short time after that, this one just to visit his brother and make sure the bodies hadn't been found.

"Finally, when he discovered that Acker was making one of her Lunar trips, he made one of his own. I checked with Customs; their records show he arrived three days before she did. He then killed Donnie Frie and stashed her with the others. When Acker arrived, he picked up Helen Orvis and murdered her.

"Now he changed his tactics. *This* body he wanted found. He dumped Orvis's body near a popular tourist area and waited. When it made the news, he went looking for Acker. He knew his client would recognize him no matter what his disguise, so he probably used

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the murder of Orvis as his reason for coming and looking for his star client—fear for her safety or some such. When he got her alone—zip. He took her body out and dumped it, like he'd done with Helen Orvis, where it would be found."

Debbie took a breath and a drink of water and went on, "He then took the next flight back to Terra, waited for the news of Loreli Candle's death to hit the papers, or for us to contact him. When the news broke, he returned to Luna as Jean Buton, bereaved agent and ex-husband, and registered at a hotel. He showed up for his talk with us and found out no one was looking even remotely in his direction. He also discovered that because of the effect of the desiccation, we couldn't even place the time of death exactly. He must have felt a tremendous sense of success. I noticed that reaction as he left; it was one of the things that made me start asking about him in the first place. He didn't act like I thought he should under the circumstances. I knew he had to be hiding *something*—but I'll have to admit I didn't even remotely suspect him of being the murderer."

Debbie gave a resigned shrug, as if to say you can't guess right all the time, and continued, "After I'd talked to him, he went back to his hotel. Next—although perhaps not the same day—he put on his disguise and slipped out through the service passages, neatly avoiding our surveillance in the process. He then recovered the three bodies he'd stashed and spotted them in locations where he was sure they'd be discovered before too long. He then returned to his hotel, got rid of his disguise, and settled in to wait for us to release the body of Acker to him so he could return to Earth, bury her, get her will probated, and sit back to collect all those lovely residuals he would inherit."

Debbie gave a bitter grimace. "It must have amused him no end to watch us follow his carefully constructed plot and chase our tails looking for a homicidal maniac with a hate for pop-shoppers."

"Curiosity kills me, Captain," Arneaux interrupted, then grimaced before continuing, "bad choice of words, but why did he disguise himself as Councilman Scithers?"

Debbie chuckled, an almost pleased sound. "Scithers was the perfect disguise. Plenty of pictures available to work from, so the disguise would be consistent each time. Plus the fact that Scithers had been banging on his Bible and ranting against liberals in general, and hookers in particular, in a way that made people question his sanity to start with. Scithers set himself up as the perfect scapegoat. The religious fanatic turned homicidal maniac. The plot is ancient. I wouldn't be at all surprised to find out that Buton had acted in a remake of *Elmer Gantry* sometime during his career as Jack Starret."

Debbie sat back and smiled at her audience. "Now we know who killed those girls and how. No raving lunatic; just a cold blooded killer with a lust for his clients' money."

Uncle Jim nodded. "It fits, Debbie. The whole thing is perfectly logical. Every bit of evidence points to Buton." He let his eyes travel from face to face. "But. That evidence is also strictly circumstantial, and a competent attorney could make cole slaw of it. Also I seem

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to remember that Buton was a Cajun, with a heavy Cajun French accent. Our killer, from all reports, spoke good Lunar Lingua Franca with no noticeable accent. I don't doubt that your analysis is right, but how do we *prove* that Buton is guilty?"

Debbie answered with a satisfied smile than ran from ear to ear. "You're almost correct concerning the accents, Uncle Jim. But if you'll recall, the one barman noticed a slight accent he couldn't place. I'd—"

The buzzer on Debbie's comm set interrupted her. When she answered Mae reported, "Boss, I have a stack of tapes sitting on my desk that a courier from the library just delivered. Where do you want them?"

"Bring them in, Mae. Bring them in." Debbie grinned at Uncle Jim and said, "I think the second half of our proof just arrived."

Debbie waited until Mae had set the stack of tapes on Debbie's desk, then explained, "Buton spent a lot of time in New York with his real father. I would bet those excursions also gave him a flair for dialects. A kid with a Cajun accent would learn New York patois fast, or collect a lot of bruises on both his ego and his body. Also an actor with a Cajun accent isn't going to be in very high demand." Debbie pointed at the stack of tapes. "Not that high, at any rate. Ten to one, the Cajun accent was for our benefit and business reasons. People tend to underestimate anyone who talks with a provincial accent."

"You said the tapes were the second half of our proof," Leeds remarked. "What's the first half, and how do the two connect?"

"A friend of Uncle Jim's gave me the first half," Debbie grinned.

Uncle Jim laughed and smacked his forehead with the palm of his hand. "Gertrude's voice prints and tapes of the killer speaking. Of course!"

"Bullseye!" Debbie agreed and held up the data cube. "We put Gertrude's data in the computer, load up the vids with Jack Starret in them, starting with the ones where he isn't playing a Frenchman or a Cajun, and ask the computer to find us a match."

It took less than forty-five minutes. They all stared at the display, and Simon Arneaux said in a triumphant voice, "That about wraps up Mr. Buton and serves him on a platter! One killer to go. Those prints are a perfect match."

Uncle Jim played back the incriminating tape and the voice recording taken in the spigot, then shook his head and said, "I'll be damned if Buton didn't even use a line from the movie to pick the girl up. That's got to be the end all of something or other."

Debbie smiled at her husband and said, "James, darling, will you see about getting an arrest warrant issued for one Jean Buton, plus aliases, and ship a copy to my father so we can start extradition proceedings." She thought for a second and added, "And suggest to Pop he look into Millicent Acker's accounts rather carefully. Buton was also Acker's business manager, and I noticed a couple of things in the data my Dad sent which might indicate he was embezzling from her. It could be another reason he decided to kill her, especially if she was thinking of changing agents. Stars on a down-slide often do that, I understand."

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Leeds grinned at his wife. "Damn nice job, darling. I'll get this stuff processed post haste. It'll be on its way before you have dinner cooked and on the table."

The first of several empty tape boxes missed Leed's ear by less than an inch.

"OK, OK! We'll eat out," Leeds said between ducks and chuckles. "You've earned it. You pick, and I'll buy."

"Damned right we've earned it," Debbie told him with a scowl that ended in a giggle. "We've all earned it. Uncle Jim, Simon, and Bernie too. I say the *Overlook* in Luna Tower. Simon, get in touch with Bernie and tell him to meet us there . . ." Debbie glanced at her chronometer and finished, "twenty-one-hundred hours. My husband is buying gourmet meals for all of us."

"My poor bank account," Leeds groaned in mock agony.

"Shut up, nephew," Uncle Jim told him, "and let's get this circus struck. This is one meal I don't want to be late for. And am I starving!"

10

Five days later, Debbie's father called her. Jim Leeds and Debbie listened as he told them. "We found Buton's body in his bedroom, no note, no nothing—just Buton with a .45 Mag stubby in his hand and his brains splattered all over the ceiling. God only knows where he had that pistol hidden. I would have sworn we'd searched that house so thoroughly not even a pocket knife was there we didn't know about. We were wrong. I'm really sorry, Daughter."

"It's OK, Pop. Dead is dead, whether it's via Luna's execution locks or a self-administered bullet. Buton can answer to a higher Judge now." She gave her father a wry grimace. "I almost expected something like this, or an attempt to reach Cajun country, once he found out he was wanted. But I would like to know how he got loose to get back to his house in the first place once you had him in custody."

Debbie's father grimaced. "We never gave him the chance to skip to New Orleans. We'd *never* have found him if he'd managed to get back to those bayous. As to how he got out . . . bail, Daughter, and a damn good lawyer and a lenient judge. The only charge the Republic of California could hold him on was embezzlement—you were right about that one by the way. His attorney got him free on bail for the embezzlement charge while he was fighting the extradition. We put a man on him —several, in fact—but we couldn't invade his privacy. One of the men heard the shot, figured the illegal discharge of a firearm was reason enough for rearresting him, and broke into Buton's home. That's when we found him." The elder Mckenzie shrugged and sighed. "Now I have a question for you. You said you almost expected him to kill himself. Why?"

Debbie nodded. "Everyone tends to forget that most premeditated murderers, no matter how heinous or inhuman their actions seem to us, are just everyday people. They have to justify their crimes in their own minds long before they commit them. Sometimes the justification isn't enough, and the crime remains uncommitted. Sometimes it won't hold up under the stress of the act. Buton was a man at war with him-

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self. His Cajun side might kill in a sudden fury, but it would never plan and execute a cold blooded series of killings like Buton committed. That was the cool, rational New York side. Where money was concerned that side dominated. To that side, the money and career Millicent Acker was throwing away was rightfully Buton's; it had been the result of his management and brainwork, and she was stealing it from him. But the Cajun side couldn't handle that. It must have continually fought the things Buton was doing. They violated every sense of honor a Cajun has. The Cajun side finally won out and salvaged its honor in the only way it could; it destroyed itself."

Debbie shook her head, "I think Buton would have suicided eventually, even if we hadn't caught up with him—and we nearly didn't. If it hadn't been for that bio-analog chancing to be in the right place at the right time, we probably never would have been able to convict Buton. He was one step ahead of us all the way. Only bad luck tripped him."

Leeds put his arm around his wife, "That I don't believe for a second. I know my wife too well. Sooner or later, you'd have found something that would have put Buton in the execution lock."

"Amen to that!" Debbie's father agreed when the transmission lag caught up and he heard Leeds's statement."

Debbie blew her father a kiss and placed one more effective, and just as sincere, on her husband's lips. "I love you both dearly," she told them. "Now, let's get some lunch. I'm starved again —and this time, I'm buying." ■

●The universe is the only thing that cannot be reproduced accurately in a miniature model —on any scale. This impossibility is shown by the fact that, if the earth were represented in such a model by a one-inch ball, the nearest fixed star would have to be placed more than 40,000 miles away.

Freling Foster

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The Alternate View

SHUTTLE DOWN: QUINTENNIAL REPORT

G. Harry Stine

Fact follows fiction, and I'll proceed to prove it.

The December 1980 through March 1981 issues of *Analog* carried a four-part serial by Lee Correy entitled *Shuttle Down*. A little more than five years ago on April 12, 1981, the day the Space Shuttle *Columbia* first flew, Ballantine/Del Rey Books published *Shuttle Down* as a mass-market paperback. In December 1985, Ballantine/Del Rey reprinted the novel (ISBN 0–345–33179–6). Briefly, the yarn was a fictional scenario in which the space shuttle Orbiter OV–104 *Atlantis* (not then built) suffered an abort during a civilian Landsat launch into sun-synchronous polar orbit out of Vandenberg Air Force Base, California, and was able to make an unscheduled landing at Mataveri Aerodrome on Isla de Pascua (Easter Island), owned by Chile. It's a classic SF yarn about the meeting of two alien cultures—American hi-tech and media types versus the Chilean military and the Pascuans, with some Soviet machinations tossed in. The big problem in the story was: How to get the Orbiter off Easter Island and back to the Cape. It's not easy to move a 75-ton brick-covered glider around. Read the book and you'll learn why.

The novel was written because I'd researched a book, *Shuttle Into Space*, published as a juvenile by Follett in 1978, making it the first Shuttle book published . . . except that few people saw it. In the process, I discovered that no one had paid the slightest attention to a factor I'd run into 35 years ago at White Sands: Rocket-powered vehicles can fail. The Space Shuttle program was funded and operated on the basis of 100% success. There was neither time nor money to consider what to do if something failed. To hedge their bets, NASA arranged for emergency landings at US air bases in Rota, Spain, and Okinawa, which covers launches out of the Cape if something not very serious goes wrong.

But at that time, nobody thought about abort plans for Vandenberg. There was (and still is) a 4-minute gap in the flight profile between the ability to make a Return To Launch Site Abort (RTLS) and an Abort-Once-Around (AOA) or an Abort-To-Orbit (ATO). If there's a propulsion failure in that 4-minute gap, the brick-covered streamlined anvil is going to come down in the water. NASA has not talked about water abort. When the Shuttle hits the fume, the forward module simply comes out through the front of the external airframe and sinks like a stone. So any pilot in his right mind had better try to bring it down on a dry land airport.

I have written NASA about what I'd learned, but I knew how far that would get because of what happened to other recommendations and suggestions I'd made when I'd been paid a consulting

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fee to do just that. Or I could write a technical paper for the big aerospace professional society, pay my own way to a meeting, and talk to a half-awake audience who'd forget it.

Peering over my shoulder was Lee Correy who remarked that the Easter Island emergency landing matter would make a neat piece of fiction. Actually, he stole the idea from himself because he'd written a short story with a similar theme, "The Plains of San Augustine," which appeared in the April 1955 issue of this magazine. But it took more than just filing off the old serial numbers and putting new ones on. . . .

I wish to point out that everything Lee Correy put in the novel was true, accurate, and correct at the time, including the statement from the NASA official that the name badge on an astronaut's flight coveralls was then considered to be adequate international identification in lieu of a passport.

Anyway, read the novel for the details. I'd like to tell you about what happened *after* the novel was published here and by Ballantine/Del Rey.

Judy Lynn Del Rey sent 100 copies to NASA on pub date. Within days, irate NASA managers were storming through the halls of NASA headquarters waving the book and wanting to know, "Who was the SOB who wrote this?" Then they started to study it.

The book depicts NASA as a procedures-oriented organization. This is true. Fortunately, a lot of people working for NASA are willing to throw the procedures manual away or even write a new one, as Lee Correy depicted, and that fact covers the agency's anatomy when everything goes toes-up. Several months after the novel went through NASA Headquarters like a dose of Epsom salts, I got a call from a friend there (I still have friends at NASA) who told me, "You won't believe this, but *Shuttle Down* has become a NASA procedures manual for Vandenberg aborts."

NASA sent a survey team to Easter Island. I'll never forgive them for not taking me along as a consultant. The report came back, "Mataveri Aerodrome is suitable for an Orbiter landing. Everything is just as described in the book except the hotel is worse."

NASA let a contract to develop a refuelling capability for the Boeing 747 (NASA 905) that carries the Orbiter. NASA realized they couldn't even get the Orbiter back from Okinawa if they had to. As of this writing, however, they haven't solved the mid-air refuelling problem. Seems jet fuel "degrades" the Orbiter thermal protection tiles or something, which is no surprise since those super 1969 hi-tech tiles won't go through a rainstorm without damage even though my 1969 Piper Cherokee will.

In 1983, I was in the nation's capital for other reasons, and Dr. Hans Mark told me that NASA Administrator James Beggs wanted to see me. Wow, I thought, maybe they want to tap all the expertise that came out of the novel's research so they don't spend time and money re-inventing the wheel. I had a nice chat with Jim Beggs who's a retired naval officer with all the grace and manners one expects from a graduate of the Naval Academy. But it was a social visit. I think Beggs wanted to meet the SOB who wrote the book. I told him he had lots of other problems with the Shuttle that should be looked into, to which

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he replied, "Yes, but I'm not going to tell *you* what they are!"

Remember that the *Enterprise* showed up at the 1984 New Orleans World's Fair? That cost NASA a bundle because they had to fly the 747-Orbiter into a naval air station, unload the Orbiter, transfer the Orbiter to a barge, transfer the Orbiter from the barge to the fair site, and then do it all backward after the Fair closed. NASA justified that operation because they had to learn how to handle an Orbiter in ways and places that were out of the ordinary. *Shuttle Down* had convinced them of that.

On March 15, 1985, NASA began discussing arrangements with the government of Chile for Shuttle contingency landing rights at Mataveri Aerodrome. Included in the discussions was the need to make exactly and precisely the changes and additions to Mataveri that were detailed in *Shuttle Down*. How did I know what Mataveri looked like? Any individual in the USA can order a "Jepp chart" which is an approach and airport diagram published by Jeppesen Sanderson, Inc. in Denver, Colorado. Only a few airports in the world, mostly in the Soviet Union, don't have a current Jepp chart available.

And then it hit the fan in Santiago because someone (guess who?) started a disinformation campaign that the Shuttle would carry space weapons, that Isla de Pascua would become a United States military base for SDI equipment, etc. All of that sounded awfully familiar to Lee Correy.

The telephone rang. It was Señor Nicolas Luco, editor of *El Mercurio*, Santiago's largest newspaper, direct dial by satellite, his phone to mine. He'd read the novel. He complimented me on my knowledge of Chilean history and government and my accurate portrayal of his countrymen (which I'd gotten from researching the Encyclopedia Britannica and the Public Library). He interviewed me for his newspaper. Although Lee Correy tries hard to choose fictional names for his fictional characters, the Chilean junta really does have a member named Admiral Montero.

Later, I was contacted by a Chilean army general who's a junta member with an offer to pave the way for publication of the novel in Chile under very attractive terms. I turned it over to my literary agent and wrote a gracious reply to the general. (Note: I have not yet heard from the KGB. . . .)

In the meantime, space shuttle Orbiter crews now carry international identification papers and the Orbiter itself has all the required international documents.

In short, because Lee Correy wrote *Shuttle Down*, most of the things that happened in the novel can't really happen now.

At any rate, I thought it worthwhile to take up a whole *Alternate View* column reporting on this because fact is really far stranger than fiction and in this technological culture, science fiction does indeed forecast reality. Besides, it's been a lot of fun dealing with all the consequences of what I thought at the start would be nothing more than an interesting, entertaining yarn.

POSTSCRIPT

The above was written 12 days before the Challenger exploded on STS Mission

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51-L, instantly killing the Challenger Seven. Many science fiction authors, myself included, have written about such a thing, as we have about so many other consequences of our technological civilization. It's fun to watch some of our forecasts come true but devastating when others such as Mission 51-L become reality.

Although the Challenger disaster was not survivable in contrast to the scenario of Shuttle Down, *I had discussed the possibility of a space shuttle catastrophe in "The Sky is Going to Fall" (Alternate View, August 1983). I've been asked repeatedly in the last few weeks what caused me to write both the novel and the AV column. My response has been that technology can bite whether you're working with fire, the most primitive technology, or with the most modern "high-tech." Every technological device has its failure modes, and the STS system is full of them, which is the reason behind Jim Beggs's remark to me. But a jet airliner or an automobile also has failure modes, and we accept the risks of using these devices and also have learned by hard and sad experience how to engineer these systems to reduce (but not eliminate) the likelihood of non-survivable failures. Any person who doesn't understand that Murphy's Law isn't a joke will probably be hurt or killed by technology.*

However, my August 1983 forecast of the manner in which the national news media would treat the catastrophe was wrong. This may have been because of what some of you *did before and immediately after Mission 51-L, whether you'd read that AV column or whether you just did what you knew you had to do. It remains to be seen how the news media will continue to treat the manned space program in the months between when I write this and when you read it. It will be even more dismaying to discover how many scientists and academicians—people who should favor extending human horizons—will rise to join the opposition because, for some strange reason, some intellectual explorers oppose the activities of physical explorers who put their lives, not just their reputations, on the line.*

The battle to extend mankind's frontiers into the unknown continues in the lab, in the field, on the oceans, in the air, in space, and in the minds of curious people everywhere. And another battle continues to rage, too. In The Fountainhead *the late novelist Ayn Rand has her architect hero Howard Roark state, "Thousands of years ago, the first man discovered how to make fire. He was probably burned at the stake he had taught his brothers to light. . . . But thereafter men had fire to keep them warm, to cook their food, to light their caves."*

Many people are talking about the "lessons of Mission 51-L." For many readers of this magazine, these lessons were learned years ago but were forgotten or were ignored when they were brought up for discussion. Therefore, perhaps an appropriate epitaph for the Challenger Seven might be an old one: "Lest We Forget." ■

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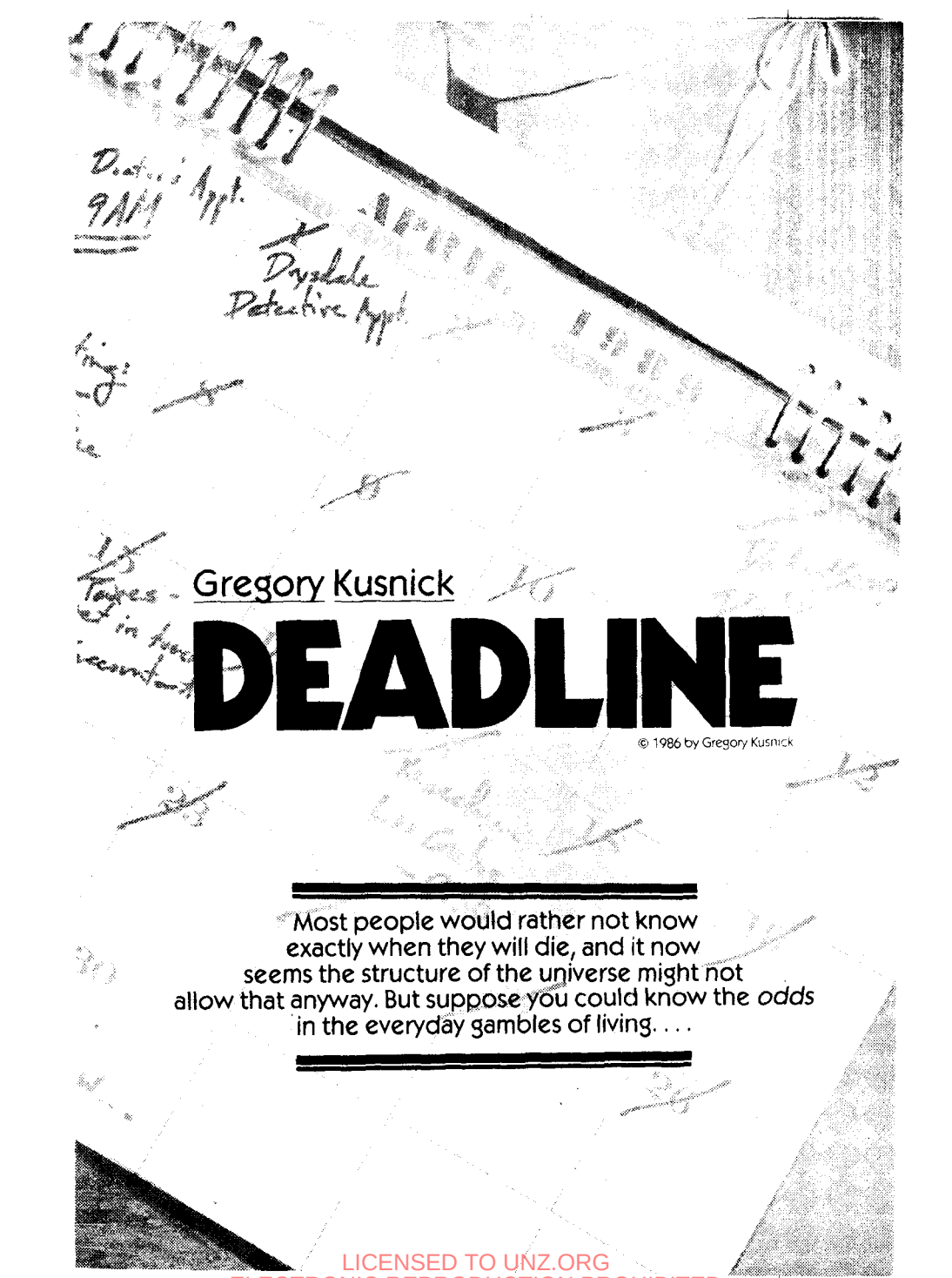

Gregory Kusnick

DEADLINE

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Most people would rather not know exactly when they will die, and it now seems the structure of the universe might not allow that anyway. But suppose you could know the *odds* in the everyday gambles of living. . . .

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Day 1: Monday

"Good morning, all," the tall man announced, setting a cardboard carton on Harry Meisner's desk. "I'm sorry I'm late."

"That's okay, Mel," Harry told him. He tipped the carton to peer inside. "Are these them?"

"That's right," Mel Roth confirmed. "The first batch of manufacturing prototypes, serial numbers 0001 through 0004."

Harry pulled one out of the box and studied it. Flat, credit-card-sized, its front face occupied by a standard numeric keypad and display, the device twisted slowly back and forth on the fine gold chain twined in Harry's fingers. An engraved logo flashed in one corner as it spun: AIONOS INCORPORATED, it proclaimed boldly, and in smaller letters, *Personal Security Systems*. "So that's an aionometer," he murmured.

"Looks like a calculator to me," Bernice Wilder remarked.

"It's supposed to," Walt Jacobs told her. "That was a deliberate marketing decision. We figured it would seem less mysterious that way." He turned to the engineering chief. "When did you finish them, Mel?"

Roth's face creased in a weary smile. "At about half past one this morning."

"Now that's dedication," said Wilder. Then her expression sobered. "I suppose this means it's time to start looking for some second-round financing, for setting up manufacturing facilities and whatnot." She shot a glance at Harry. "I'll need your support on that, Chief; you know how the venture capitalists feel about dealing with subordinates."

"Sure," Harry agreed. "You've got it." He looked again at the device in his fingers. "Do they really work, Mel?" he asked Roth. "Have you tested them, I mean?"

"Well, I've run some diagnostic tests in the lab, of course. But no, they haven't been field-tested. Not *yet*." The engineer's eyebrows arched meaningfully.

"Uh, right." Harry dropped the unit back into the carton and counted. "Four of them, four of us. Okay, gang, I need volunteers." He glanced at Bernice Wilder. "Ladies first?"

The financial VP flashed him a dirty look. "Since when are you a gentleman?" Nevertheless she sat up straighter in her chair. "What do I have to do?"

"Not very much," Roth told her as he knelt beside her, aionometer in hand. "Just fasten the sensor loop—this gold chain—around your neck; that's right. Now when I switch the unit on you're going to feel a slight tingle—there." An indicator on the face of the box glowed redly. "Do you feel it?"

"You mean a kind of haunted-house feeling at the back of my neck?"

"That's one way of describing it, I suppose."

"I can't say I like it much."

"You're not supposed to like it. When you feel that sensation, it means your life is in danger. The stronger the feeling, the greater the danger."

"You mean I'm in danger right now?"

"Only in the sense that you'll probably die before the age of 100. That's what I've got the threshold set at right now. See?" His finger tapped the numeric readout. "Now as I lower the

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threshold, there'll come a point where the tingle disappears." He depressed a key and held it.

"There!" Wilder announced. Simultaneously, the red light on the face of the box turned green.

Roth showed her the readout again. "Eighty-three years." Then he handed her the aionometer and stood up. "Congratulations; you're going to be an old woman some day."

"How reassuring." She fingered the device uncertainly. "Now what do I do with it?"

"You wear it."

"All the time?"

"All the time. You do want to be an old woman, don't you?"

"Well, I'm not exactly looking forward to it. But since you put it that way—" She unbuttoned the collar of her blouse and slipped the device inside.

"All right, then." Roth fished in the box, came up with a second unit. "Who's next? Walt?"

The salesman shrugged. "Might as well."

Roth repeated the calibration procedure for Jacobs. "Eighty years even. Quite a good life expectancy for a man."

"I try to keep myself in shape," Jacobs remarked, tucking the aionometer away inside his shirt.

"And now myself." Roth ran through the routine one more time. "Seventy-five. Not a record, but not bad either." Then he turned to his chief. "Now it's your turn, Harry."

Harry hesitated. *Seventy-five years, eighty years . . . What's mine going to be, I wonder?* "Well, all right," he said aloud. "If you guys can stand it, I guess I can." He clasped the gold chain around his neck, flinched at the electric jolt as Roth switched the unit on. His eyes fastened on the red indicator light. "Okay, Mel. Tune me in."

Roth worked the keys; after a longish pause the red light turned green. "Hmm. That's odd." Frowning, he touched more keys.

Harry watched impatiently. "Well? What's my reading?"

Roth said nothing, staring at the aionometer display.

"Mel?" Wilder's voice was concerned. "Mel, what's wrong?"

The engineer shook his head. "I don't quite know how to say this—"

"Just spit it out, Mel," Jacobs urged. "We're all friends here."

"That's just the difficulty." Roth looked up helplessly. "Harry, my friend—it looks like you have less than a month to live."

There was a stunned silence. Then Wilder and Jacobs spoke up simultaneously.

"But that's impossible—"

"Mel, are you sure—"

"*Hold it!*" Harry's voice cut through the babble. "Just calm down, everyone. Mel, what do you mean, a month to live? Explain yourself."

"It's what the aionometer says, Harry," Roth showed them all the readout. "There's a seventy-five percent chance that you'll die in four weeks, plus or minus a few days."

Harry paused, digesting the information. "There's no chance the machine's mistaken?"

"Well, I could test it again, I suppose—"

"Good." Harry stood up. "Let's do

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that."

Roth blinked. "Now?"

Harry nodded, his lips a thin line. "Now."

"There, do you see?" Roth's thumbnail picked out a green trace on the video display before him. Blue smoke curled up from the cigarette between his fingers. "Absolutely nominal response."

Harry frowned, staring at the cryptic webwork of curves. "I guess I'll have to take your word for it, Mel."

The four of them were gathered around Roth's laboratory computer console. Tall racks of equipment rose on either side; Harry's aionometer was jacked into one of these via a thin cable assembly. At the other end, the gold sensor loop still circled his neck.

Walt Jacobs peered closely at the intricacies of the display. "Where do you get the four-week figure, Mel? Is that on here somewhere?"

"No; this pattern is for test purposes only. One moment—" Roth laid his cigarette aside and typed a rapid sequence of commands. Abruptly the pattern shifted to another, simpler configuration, a bell-shaped curve straight out of a statistics text. "This display is an example of what I call an aionogram, a graph of—"

"Right, I remember," Jacobs broke in. "Age is measured across the bottom; probability of dying at that age is measured vertically."

"Quite right. And as you can see, there is a significant peak in probability *here*—" He tapped the screen with a tobacco-stained finger. "—at a time some twenty-nine or thirty days from now."

Jacobs straightened up. "Well, there it is, Harry. Hard to argue with that."

Harry grunted. "I don't suppose it says *why* I'm supposed to die in four weeks?"

"No, of course not," Roth admonished him. "You know better than that, Harry. The aionometer measures only the raw probabilities. It's up to you to determine the reasons behind them."

Bernice Wilder spoke up quietly from the rear. "How's your heart, Harry?"

Harry turned away from the screen and shrugged. "Fine, as far as I know. At least I've never had any problem with it before."

"That's what they all say, just before they keel over," Jacobs observed wryly. "I'd have it checked if I were you." He eyed Harry's waistline critically. "Wouldn't hurt you to drop a few pounds, either."

Roth concurred. "It would probably be wise to have a complete physical examination—the sooner the better."

"Okay!" Harry threw up his hands. "You've convinced me. I'll schedule an appointment with my doctor as soon as I can." A thought struck him. "By the way—"

"Yes?" Wilder prompted.

Harry lowered his voice. "Not a word of this goes outside of this building. Is that clear?" His sharp glance stabbed each of them in turn. "The company's at a crucial point right now, financially. I don't need to tell you what could happen if the investors got wind of this. So if anybody besides the four of us needs to know about this thing, let me do the telling. Understood?"

"Right, Chief."

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"Sure thing."

"Of course."

"All right, then. Until I hear from my doctor it's business as usual. Now let's get on with it."

Day 8: Monday

Mel Roth pushed his plate away and fished a pack of cigarettes from his shirt pocket. "Have you seen your doctor yet, Harry?"

Harry finished off his last bite of pie and nodded. "Last Friday. Let me tell you, it wasn't easy getting an appointment so soon. I had to make up a story about a mysterious 'dizzy spell' that left me all weak and worried. I think he may have suspected something was fishy, but he gave me a thorough going-over all the same."

"And?" prompted Jacobs.

"Yes, what did he say?" urged Wilder.

Harry shrugged. "*Nada*. There's nothing medically wrong with me that he can detect."

Disappointment showed on three faces.

"Thanks a lot, gang," Harry said grumpily. "You guys actually *wanted* me to be sick."

"Well, it would make things easier to understand," Roth apologized, tapping an ash from his cigarette.

"Maybe you ought to have another exam," Jacobs suggested. "One of those really complete jobs—three days in the hospital, barium enema, full X-rays, the works."

"No," Harry said flatly. "What excuse could I possibly give, that wouldn't endanger the company? Remember what we said last week about secrecy."

"Harry," Roth cautioned, "this is your *life* we're talking about."

"The company *is* my life, Mel. I don't have to tell you that."

Roth was silent.

"But if the problem's not medical," asked Wilder, "then what *is* it?"

Harry shrugged uncomfortably. "Could be anything, I suppose."

"No," Roth said suddenly. "Not quite *anything*."

"Hm?" Harry glanced at him sharply. "What makes you say that, Mel?"

"Well, recall the shape of your aionogram as we saw it last week." The engineer laid down his cigarette, brought out a pen and began sketching on his napkin. "Now if I were to put this into words, I would say that your death is expected *not* sometime within the next few weeks, but at some fairly specific time a few weeks from now. Do you see the difference?" He retrieved his cigarette and took a puff. "As if there were already in motion some train of events that will mature at that time."

"I get it!" Jacobs said excitedly. "So all we need to do is look for something with that kind of time-delayed characteristic."

"Nothing to it," Wilder gibed.

"Well, at least we're making progress," Harry said reasonably. "Good; now that I have some idea of what to look for, it should be that much easier to avoid it when it comes."

Roth looked troubled. "I'm afraid it's not that simple, Harry."

"Huh? What's not that simple?"

"Look at your risk. Right now, look at it."

Puzzled, Harry drew his aionometer from beneath his shirt and worked the controls. "Seventy-five percent, same

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as last week. So?"

Roth sighed. "Don't you see? Your optimism, these deductions we've just made—they're all part of the pattern. The aionometer has already taken them into account. Even knowing what you now know, there are still three chances out of four that you'll die before the month is out."

"And still three weeks left in which to find that fourth chance," Harry countered. "I intend to find it, Mel." He pushed back his chair. "Come on, let's get back to work. We've spent enough time brooding about this already."

Out in the parking lot they split up, Roth and Jacobs heading off toward the engineer's car while Harry accompanied Wilder to her vehicle, a shiny red MG convertible with license plates that said GO WILD.

"Shall we put the top down?" the woman suggested. "It's such a nice day."

"Sure, why not?" Harry helped her fold and stow the stiff fabric, then climbed into the passenger's seat. Moments later they were merging into the lunch-hour traffic. "Mel seems to be taking this whole thing pretty seriously," he remarked.

Wilder was silent a moment, glancing back over her shoulder as she changed lanes. Then, "Don't you take it seriously?" she asked him.

Harry shrugged. "Not the way he does. To me it's all very abstract and theoretical, like black holes or quasars or something. Sure, I can accept it, in-

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tellectually. But Roth really *believes* it."

"Can you blame him?" She tossed her head in the warm breeze, sunlight glinting off her dark glasses. "After all, he's spent the better part of his adult life working on it. He *has* to believe it."

"I suppose so." Harry rested his forearm along the gleaming chrome of the MG's side. The smell of automobile exhaust was pungent in his nostrils, the sound of engines loud in his ears. He glanced across at Wilder, at the slight unconscious smile that settled onto her features as she detoured around a slow-moving Datsun.

"Even so," the woman mused, shifting gears, "I know what you mean. Aionometry, predicting—no, *measuring* a person's future." She snorted. "Black holes and quasars."

Ahead of them a traffic light changed from green to yellow. Harry saw the gap between them and the car in front widen as Wilder laid her foot gently on the brake pedal. They eased to a stop just as the light turned red.

"Still," she went on quietly, "what if he's right? Hell, he *is* right, and we both know it."

The *whoosh* of cross traffic made a soft background to Harry's words. "I don't dispute that. But what am I supposed to do, crawl into a hole for the next three weeks? I've got a company to run."

Wilder had nothing to say to that. They sat in silence, watching the switching of the signals. Finally the left-turn traffic from across the way began to taper off; it would be their turn next.

Wilder reached for the shift lever. The light turned green.

"Wait," Harry blurted, his hackles rising. "Don't go."

Simultaneously Wilder's hand jerked back. Horns sounded impatiently behind them, but Wilder held her ground. Suddenly, from the left-turn lane opposite, a flame-red Camaro roared into the intersection against the lights, tires squealing as it slewed around in a ragged turn. Watching the car careen toward them, Harry thought for a moment that they would be obliterated where they sat. But the other driver kept control of his vehicle—barely—and it shot into the expressway on their right and disappeared. As it did so, the prickling at Harry's neck ceased.

Cautiously Wilder put the MG in gear and eased it forward. Her voice was strained as she ventured, "You felt it too?"

Harry nodded. "Just before he appeared. Like a premonition, almost." But he knew it was no premonition.

It was the aionometer.

An uncontrollable shudder swept over him. *Christ*, he thought dazedly. *The damned thing actually works.* He shuddered again.

"Harry—"

"Don't say it," he cut in. "Don't say it. Just drive."

Wilder drove.

Day 9: Tuesday

Harry sat alone in his office, his back to his desk and the stack of reports that lay, ignored, upon it. Beyond the office window a flat plain of parking lots stretched to the limit of visibility, interrupted here and there by tiny oases of grass. Monolithic buildings, all alike, reared up at intervals from that gray

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desert, wavering mirage like in the early summer heat. Crowded about them were the vehicles, waxed and chromed and huddled like lizards in the meager shade.

In all that stark landscape, nothing moved. Or almost nothing: Harry's eye caught a flicker at the edge of vision, resolved it into a car, a blue-and-white Volkswagen van, threading its way toward him through the maze of buildings and lots. It slowed as it drew nearer, hesitated, pulled into the lot fronting Harry's own building, found a space, parked. A tall black man emerged and strode briskly toward the building, passing quickly out of Harry's sight.

Harry waited. His phone buzzed; he picked it up. "Yes, Jeri?"

"Mr. Drysdale is here to see you."

"Right, send him in. Oh, and get Mel Roth in here too, would you please? Thanks."

Harry rose as the office door opened and the black man appeared.

"Mr. Meisner? Hugh Drysdale. Pleased to meet you."

"How do you do?" Harry accepted the man's hand, sizing him up. Up close Drysdale looked to be about forty years old. His grip was warm and firm. "Please, have a seat," Harry urged him, and got back behind his desk.

"Well, what can I do for you?" Drysdale asked after they had got settled. "You said over the phone you had a problem of some kind."

"I do." Harry chose his next words carefully. "Mr. Drysdale, I have reason to think my life is in danger, but I don't know how or why. Can you help me?"

"You mean protect you? I'm a detective, Mr. Meisner. Not a bodyguard."

"And it's your services as a detective that I require." He leaned forward. "Well?"

Drysdale frowned. "Just what makes you think you're in danger, anyway?"

Harry drew forth his aionometer from inside his shirt. "This."

Drysdale looked faintly amused. "And what, may I ask, is that?"

"It's called an aionometer, from the Greek word *aion*, meaning lifetime or personal destiny. It is a machine that knows when a man is going to die. This man." He thumped a finger against his chest. "Me."

Drysdale snorted. "Mr. Meisner, if this is what you called me here for, then we're both wasting our time." He started to rise.

"Wait." Harry held up a hand. "Hear me out. This is no joke. You see—"

There was a soft knock on the door. "Come in," Harry called. The door opened and Roth entered. "Mel, this is Hugh Drysdale, a private detective who I hope is going to help us with our, uh, situation. Mr. Drysdale, Dr. Roth." They shook hands. "Pull up a chair, Mel."

Roth did so. "What's up, Harry?"

"Mel, I want you to explain to Mr. Drysdale here how the aionometer works."

"Well . . ." Roth swung his chair about to face the investigator. "It all has to do with the quantum-mechanical structure of space-time. You've heard that time is the fourth dimension, I suppose."

Drysdale nodded. "Sounds familiar."

"And that every bit of matter in the

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universe—a human brain, for instance—traces out a curve in space-time called a 'world-line.' Well, about fifty years ago a fellow named Heinlein—a science fiction writer, actually—had the idea that if you could measure the world-line of a person's brain, you could predict when that person was going to die."

Drysdale raised an eyebrow but said nothing.

"Of course, it's not quite that simple," Roth continued. "For one thing, the principles of quantum mechanics say that there is no fixed future, no single lifeline to be neatly captured and recorded. What there is instead is a branching tree of alternate lives, each of its own particular length, do you see?"

The investigator nodded. "I think so."

"Good. What the aionometer does is to measure the 'depth' of that tree, if you will, much as a ship uses sonar to form an image of the ocean floor. Uncertainty considerations prevent us from obtaining an exact picture, but only a sort of statistical approximation. Nevertheless, for our purposes this is quite adequate."

Drysdale looked from Roth to Harry. "You guys are serious."

Harry nodded. "We're serious."

Silence. Then: "Just how long does this eye-oh-nometer"—Drysdale was careful with the pronunciation—"say you've got?"

"Three weeks," Harry told him.

Drysdale whistled. "Man, that's not much."

Harry grunted. "Tell me about it."

"And you have no idea what the reason is?"

"None."

"I see." Drysdale considered for a moment. "It won't be easy."

"Then you'll do it?" Harry asked.

"Well, it's not my usual sort of case—"

"Just what is your usual sort of case, if I may ask?"

Drysdale shrugged. "I do a lot of insurance work, I guess. Arson, missing persons. That sort of thing."

"Oh," Harry said slowly. "I'm sorry, I didn't realize you were a specialist—"

"All the same," the detective interrupted, grinning, "your problem intrigues me. I'm thinking I might just take a shot at it."

"Great! When can you start?"

Drysdale raised a callused palm. "Hold up a second. There's a couple of things I'd like to get straight first."

"Such as?"

"Such as, I'm not sure what you think you're getting for your money here, but Philip Marlowe I'm not. I like to do my day's work, then go home and have dinner with my wife and kids. Oh, I'm willing enough to put in some overtime when it's called for. But if you're looking for a hero, you'd best look somewhere else. Clear?"

Harry nodded.

"Good. The second thing is that I won't be party to any kind of wrongdoing."

"Mr. Drysdale, I assure you our operation is completely legal—"

Drysdale gestured impatiently. "Legality is your business, Mr. Meisner. What I'm saying is that I won't be mixed up in any kind of racket or scam. You

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two gentlemen have made some pretty extraordinary claims here today. For the time being I'm willing to take what you've said at face value. But the minute I find out you've been putting me on, I'm gone. Is *that* clear?"

Harry grinned. "Quite clear, Mr. Drysdale."

"Okay then." Drysdale produced a notebook from an inner pocket, flipped it open. "Let's have the whole story again, from the beginning."

Day 17: Wednesday

Harry saw Drysdale only occasionally during the next week. From time to time the investigator would stop by Harry's office with a list of questions, but for the most part he went about his business inconspicuously.

Harry himself was kept occupied by the company's business. There were customer prospects to meet, and Roth's manufacturing plan to review and approve. Quarterly financial reports would also be due soon, and Harry spent much of his time in Bernice Wilder's office, searching for ways to stretch their dwindling bank balance.

"I told you it would be tight, Chief," she reminded him one afternoon.

"I remember," he acknowledged. "Say, what's the progress on that venture capital arrangement you were trying to set up?"

"You mean the Kesselman deal?" She sighed. "I'll tell you, but you won't like it."

"So tell me already."

"Well, the good news is that he's got two million dollars for us."

"Sounds pretty good to me. What's the bad news?"

"He wants another twenty percent ownership in return."

"*Twenty percent?*" Harry was incredulous. "No. It's too much. Christ, he's already got thirty-three. Another twenty will put him in control."

"That's his offer, Harry."

"Well, I reject it. Try somebody else; get me a better offer."

"Harry, I've tried them all already. I'm afraid Kesselman's deal is as good as we're going to get."

Harry shook his head. "Goddam vulture capitalists," he growled. "They must know we're hard up." He thought for a moment. "I'd better go see Kesselman myself, try to bargain him down a bit. What do you think?"

Wilder shrugged resignedly. "It's worth a try, I suppose."

"Okay, set it up. Jeri has my sched—" A sudden prickling stood Harry's neck hairs on end, as if a chill hand had clamped itself around his collar.

"Harry?" The woman eyed him curiously. "Harry, are you all right?"

"I think so." He fumbled at the buttons of his shirt, drew out his aionometer. The indicator on its face glowed a steady red.

Wilder's eyes met his uneasily. "Now don't panic," Harry cautioned her. He keyed in an instruction to mute the tactile alarm, allowing his neck muscles to relax as the irritating tingle vanished. "Hmm. I'd better tell Mel about this. You wait here." He pushed back his chair and stood.

"Like hell," Wilder retorted, rising also. "I'm right behind you, Chief."

Harry didn't argue, and together they headed down the hall toward Roth's laboratory. A smell of cigarette smoke and

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hot solder hit their nostrils as they entered. Harry exchanged nods with a technician seated near the door, then began threading his way through the maze of cabinets and workbenches, following the muffled drone of Roth's voice.

A second voice interrupted Roth's as they drew nearer. Harry edged around a rack of test equipment to obtain a view of Roth and his interlocutor, holding up a hand to caution Wilder to silence.

"—a minute, Mel," Hugh Drysdale was saying. "What's this 'stochastic equilibrium' you keep talking about?"

"Didn't I explain?" Roth drew on his cigarette, exhaling a cloud of blue smoke. "Well, it's nothing very complicated, simply the statistical tendency of potential timelines to distribute themselves in accordance with the aionometer threshold ratio."

"In English, Mel," Drysdale said dryly.

The engineering chief smiled. "Perhaps I'd better give an example. Consider the case of Customer Smith, who is fifty years old, in good health, and expects to live another twenty years, let's say. One day he steps off the curb in front of a speeding truck. His aionometer threshold is set at sixty years. What happens?"

"His alarm goes off. At least, I hope it does."

"Ah, but there's a problem with that, do you see? If the alarm goes off and Smith steps back out of the way, then his life expectancy remains at seventy years. So the alarm can't have gone off."

"But if it doesn't, then it should have." Drysdale frowned. "It's a paradox."

"Yes, isn't it."

"But—wait a minute, Mel. Are you telling me the box doesn't work?"

"No, only that it doesn't work *deterministically*. Look: we can't seem to decide whether Smith's alarm goes off or not, so let's assign a *probability* that it goes off, equal to fifty percent. In half the possible futures he receives an alarm, steps back onto the curb, and lives to be seventy. In the other half he gets no alarm and dies under the wheels of the truck at age fifty. His average life expectancy therefore is—"

"Sixty years!" Drysdale broke in. "Just what he's got set on his meter!"

"Precisely." Roth stabbed the air with his cigarette in emphasis. "If the threshold had been set any higher, say at sixty-five years, the odds would have shifted in Smith's favor—in this case, to three-to-one for survival. Similarly, a lower threshold would have lowered his survival rate. It is this balancing of probabilities against threshold that I have termed 'stochastic equilibrium.' "

"I see. I *think* I see. —But suppose Smith doesn't notice the alarm, or decides to ignore it? Won't that change the odds?"

"Indeed it will. That's why I speak of the probability that Smith *receives* an alarm—receives and acts upon it. The fact of the matter is that Smith's brain forms a crucial part of the loop, and is therefore forced into equilibrium along with the aionometer. The alarm is guaranteed to be exactly intense enough to affect Smith's behavior—no more, and no less."

Drysdale was silent, chewing it over.

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Harry took the opportunity to step forward.

"Ah, Harry, Bernice," Roth greeted them. "What can I do for you?"

"I got a signal, Mel." Harry showed him the glowing indicator. "See?"

Drysdale's eyes snapped up, focused on Harry's face. "When? Where? What were you doing?"

"About five minutes ago. Right, Bernice?"

Wilder nodded. "We were sitting in my office talking and suddenly it just came on."

"Think carefully, both of you," Roth urged. "What exactly were you talking about?"

Harry shrugged. "Money. The usual sort of thing. She was telling me about Kesselman's latest offer, and I didn't much like what I was hearing."

"Kesselman?" Drysdale cut in. "Arnold Kesselman, the financier?"

"That's right. Why? Is that significant?"

"Hard to tell," the detective admitted. "Depends on what you were saying about him, I guess."

"Oh, Harry was saying plenty," Wilder assured him. "Called him a 'Goddam vulture capitalist,' in fact."

"Of course, it need not have been your conversation that triggered the alarm," Roth observed. "Any contemporaneous event could have been responsible."

" 'Could have been,' " Harry echoed. "How can we find out?"

"Leave that to me," said Drysdale. He grinned. "It's what you're paying me for. Now if you'll excuse me?" He exited the lab.

"Harry," Roth said quietly, after the detective had gone. "Have you looked at your new risk level yet?"

"No, I haven't. Good idea, Mel." Harry brought out his aionometer and punched a command. "Eighty percent." His fingers curled into a fist. "*Eighty percent.* I'm losing ground."

The engineer turned his face away. "Well, perhaps Drysdale can discover something."

"You don't sound very convinced."

Roth hesitated. "No. Even with him on the job, your odds are no better than one in five." He stared at the floor. "Nevertheless, I suppose he's the best hope you've got."

Day 19: Friday

A light knock at his office door. "It's open," Harry called.

Hugh Drysdale stuck his head in. "You ready, Harry?"

"Ready?" Harry looked up from the business plan he was revising. "Ready for what?"

"That hypnosis session, remember? Come on, I'll drive."

"You're on." Harry grabbed his jacket and joined Drysdale in the corridor.

In the lobby they came upon Walt Jacobs, clad in shorts and running shoes, his naked torso sheened in sweat. "Hi, Chief . . . Drys," he said between breaths.

Harry nodded. "Hi, Walt. Looks like a nice day for a workout."

"It is."

Drysdale waved a finger at the aionometer cushioned against the wiry hair of Jacobs's chest, green light glowing placidly. "You actually wear that thing running, Walt?"

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Jacobs looked surprised. "Sure. I'd be crazy not to. That noontime traffic out there is *nuts*. Besides, it's a great training aid. Lets me know when I need to work out—or when I'm pushing myself too hard. Helps me find the right pace, keeps me from overtraining and hurting myself."

"Hmm." Harry was intrigued. "Do you think there's a marketing angle there?"

Jacobs laughed. "I'm already on it, Chief. I've got a flyer going out this week to every major sporting goods dealer and athletic coach in the country. In my view it could turn into a major market opportunity."

"That good, eh?"

"You bet," Jacobs responded. "Seriously, Harry, I think this could be the greatest thing for runners since Gatorade. It gives me the creeps to think I ever went out there without it." As he said it, the green light on his aionometer flashed momentarily red.

"Hey, that's real interesting, Walt," Drysdale said smoothly. "I'm afraid Harry and I are in kind of a hurry right now, though. Talk to you later, okay?"

"Sure, Drys. See you."

Out in the parking lot Drysdale muttered, "You see that, Harry? I don't think Walt realized he was being signaled just then."

"I think you're right, Hugh," Harry said slowly. A sudden surge of jealousy overtook him. "The lucky bastard."

"*Lucky?*" Drysdale seemed shocked. "How do you figure that?"

"The fact that he can just ignore it like that." Harry's voice took on an edge of bitterness. "I *can't* forget about mine—not if I want to live more than two weeks."

"Hmm, yes. I see your point." He guided Harry to a stop alongside a blue-and-white VW van. "Well, here's my car. You'll have to excuse the junk in the back there. It was my turn to drop off the girls at school this morning."

"That's okay." Harry climbed up into the passenger's seat and buckled himself in. "You like being a family man, do you?"

"I do." The engine coughed, then caught, as Drysdale turned the key. "That's why you'll never catch me wearing a badge. Like I said, I'm no hero—except maybe to my little girls." He grinned, hunched over the wheel as he guided the VW out of the parking lot. "How about you, Harry? Divorced, aren't you?"

"That's right. A little over a year ago. No kids." He smiled. "But then I suppose you knew that already."

Drysdale returned the smile. "Never hurts to let a man tell his own story."

"I'm afraid in this case there's not much to tell. I never did have much time to devote to family life—and I guess that was part of the problem. My wife always said I was a workaholic." He shrugged. "Hell, she's right, I admit it. I want my company to succeed, Hugh. Is there anything wrong with that?"

"Hmm. I'm not sure that's for me to say. Personally, I think a man ought to have kids. But I realize that my way isn't for everybody."

The silence stretched. Harry thought about the things he had done with his life, and the many other things he had not done. After a time he spoke again.

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"Have you ever been hypnotized, Hugh?"

"A couple times." Drysdale shot a glance across the space between them. "Why? Getting nervous?"

"A little, I suppose."

"Well, it's nothing to worry about. Just a way of focusing your mind on the suggestions I'm going to make, to be sure you take 'em seriously."

"Oh." A short pause. "Do you think it will work?"

Drysdale shrugged. "Won't know till we try, I guess."

"That's just it, though," Harry argued. "I mean, suppose it does work. Wouldn't we know already? Wouldn't my risk already be reduced, or gone completely?"

"Maybe. But then again, suppose it were gone? Would you be here in the car with me right now?"

"Hmm. Probably not," Harry conceded.

"It looks to me like it's Mel's stochastic equilibrium all over again. Your risk *can't* disappear, not completely, until you've actually done the thing that saves your life. Or sworn on your Scout's Honor to do it, which is where the hypnotism comes in."

"Huh? Sorry, you lost me there."

"Well, look. As far as the aionometer is concerned, promising to do something is as good as actually doing it, right? I mean, they both lead to the same consequences eventually—assuming of course that your promise is any good."

"I'll buy that," said Harry. "And the hypnotism?"

"Is just a little extra insurance on those promises. Posthypnotic suggestion, see? That way we can try out a bunch of different strategies in a short time, without actually waiting for you to carry them out."

Harry nodded appreciatively. "Clever."

"Maybe," Drysdale acknowledged. "Let's see how it turns out before we start giving any prizes."

Harry floated.

Eyes closed, body relaxed, he floated, buoyed up by a flow of words that freed him of weight and set him drifting above the plush warm surface of the recliner. There was no feeling of discomfort or unease, only quiet restfulness and a deep, deep trust in the owner of that so-soothing voice.

From far away, a second voice spoke. "Is he under, Doc?"

"In a minute," the first voice said. "Harry, Hugh is going to ask you some questions now, related to the plan you discussed before you came here. You'll be able to hear him and understand him as easily as me. I'll still be here, and I'll talk to you later."

The second voice moved to center stage. "Harry, this is Hugh. Are you listening?"

Harry murmured an affirmative.

"All right. Now here's what we're going to do. I'm going to describe some situations to you—situations that involve a certain amount of danger. In each case, I'll suggest something you can do to avoid the danger. Meanwhile I'll be watching your aionometer for any change in your risk. You with me?"

"Yes," Harry told him.

"Okay, then. Here we go." There was a pause, a rustle of pages turning. "You're at a party," Drysdale's voice

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continued. The scene sprung up vividly around Harry: laughter, clinking glasses, a whiff of perfume. "You've been drinking, not a lot but a little bit. You've got a glass of beer in your hand but it's empty now. Your throat's still a bit dry, and you're wondering what to have next." A full bar spread out before Harry, who surveyed it speculatively. "But," the voice warned him, "you came to the party alone. Whatever you do, you've got to drive yourself home afterward." A set of keys weighed down Harry's trouser pocket. "You'd like another beer, or some whiskey even. But you don't take it."

"Soda water," said Harry to his imaginary bartender. "Just a glass of soda water, please."

"That's right," the voice approved. "Just water. Now you can drive home safely." There was another rustle, followed by a brief scribbling of pencil on paper. "Here's another situation. You're driving, there's cars all around you. It's five-thirty, you're on the freeway, traffic is heavy and you're in a hurry to get home. . . ."

The voice droned on. Harry listened attentively, seeing the images one after another as Drysdale described them: the freeway, the heavy carton, the shadowy figure lurking in the alley. In each case he avoided danger by following the detective's instructions.

". . . you can see the smoke, you can smell the toast burning, but it's jammed in there and won't come out. You reach for a knife to pry it loose"—Harry reached—"but *first* you unplug the toaster to prevent a shock."

Harry unplugged.

"*Now* it's safe to reach in there. And whenever this happens, you'll remember to unplug the toaster first." The familiar scribble punctuated Drysdale's words. "Okay. You're working late now. It's nine o'clock at night and you're the only one in the building. All of a sudden you smell something." Harry sniffed, frowning. "You're not sure what it is, but it doesn't smell good. You go into the lab, and you find a soldering iron somebody left on. You turn it off. You're okay this time, but you decide to order a complete smoke detector system for the whole building, and for your home too, just in case."

Harry spoke up. "No."

"Huh?" There came a sound of prolonged scribbling. "Harry, did I hear you right? Will you order the smoke detectors as suggested, or not?"

"No," Harry repeated.

"Damn. There it is again." More scribbling. "Think carefully, Harry. *Why* not?"

Harry tensed, uneasy at the question. He tried to bring his mind to focus on it, but his thoughts veered skittishly away, leaving the core of his motivation unpenetrated. "It doesn't feel right," he offered, displeased with his own explanation.

But Drysdale seemed quite satisfied. "Uh-huh," he murmured absently, to the accompaniment of a final burst of scribbling. "That's fine, Harry; thanks. Okay, Doc, you can wake him up now. I think I got what I came for."

Day 25: Thursday

Arnold Kesselman's office was in Los Gatos, a good thirty minutes' drive down Freeway 17 in the foothills of the Santa Cruz mountains. Harry went there

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directly from his house that morning in order to be sure to arrive in time for the scheduled 9:30 appointment.

Arriving with a few minutes to spare, he remained in his car and spent the time reviewing the financial summary Wilder had provided him the day before. As he sat, a big olive-green luxury sedan pulled into the parking space to his left. Harry glanced up idly, then did a double take. "Bernice!"

He got out of his car, walked around to the driver's side of the big sedan.

"Hi, Chief," Wilder greeted him, rolling down her window.

"This isn't your car, Bernice."

"Sure it is," she grinned. "I just bought it last Friday."

"Really?" Harry peered past her at the dashboard. "Let's see, automatic transmission, power steering, cruise control . . . electric windows, for Christ's sake—" He blinked. "What happened to 'GO WILD'?"

"Oh, it broke down again last week and I finally decided to get rid of the damned thing."

"And *this* is what you got to replace it?"

"That's right. Isn't it great?" She patted the crushed-velvet upholstery affectionately.

"But, Bernice, you've been driving sports cars as long as I've known you. I thought you loved them."

Her smile faded, turned wistful. "Maybe I did, once. But lately it seemed like all the fun had gone out of it for me; I don't know why." She shrugged, an odd shuddery kind of shrug. "Well. Ready to do battle?"

"You bet." Harry stood back as she got out of the car. "Lead on."

* * *

"Of course I'm always happy to see you, Harry." Kesselman aimed a perplexed glance at Wilder. "But I thought I'd make it clear to Bernice that my offer was not negotiable."

"Not negotiable, hell," Harry responded. "It's too much and you know it. I'll give you ten percent for the two million, and that's tops."

The three of them were seated around a low coffee table at one end of the financier's spacious office. Kesselman was a short man, tanned and silver-haired, whose lined face was now set in an uncompromising frown.

"That's unacceptable, Harry. The risk is—"

"What risk?" Harry demanded. "There's no more risk than there was a year ago. Less, in fact; our research is complete, the technology proven—"

Kesselman's eyebrows rose at that. "So I had heard."

Harry waited, but apparently the financier had nothing more to say. "Ten percent, Arnold," Harry repeated.

The silvery head wagged once. "No."

Harry ground his teeth. "All right, then, twelve percent. But I'm telling you, that's absolutely as high—"

"Harry." Kesselman's voice was quiet, his tone regretful. "Let us be frank with each other; perhaps it will save some time. I am not going to deal with you at twelve percent. —Nor," he went on, palm turned outward to forestall interruption, "at fifteen percent, nor even, I think, at twenty percent."

Harry stared at him. *Bastard.* "How much, then?" he grated.

"Please, you misunderstand me. I meant to say that I am withdrawing my

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offer completely. I am no longer interested in financing your operation at any price."

"But, Arnold!" Wilder burst out. "Two weeks ago you said—"

"I know what I said, Bernice. But facts change, circumstances change." To Harry: "You of all people should appreciate that."

Harry went suddenly cold. "Just what are you trying to say?"

The financier's expression was remote. "To put it delicately, I have grave doubts about the continued viability of the Meisner enterprise. I think you know what I mean." He stood. "But I have other matters that demand my attention this morning. Perhaps it would be best at this point if we simply said goodbye."

Harry had plenty of time to fume on the way back to Aionos. In a way it was fortunate that he and Wilder had taken separate cars, because if she had been with him he surely would have vented his anger against her, at the cost perhaps of a valuable friendship. As it was he left her far behind in the first few minutes of driving, the green sedan fading in his mirror as he wove aggressively through the midmorning traffic.

By the end of his journey his mood had shifted to one of determination. His purposeful footsteps echoed through the Aionos corridors, alerting Jeri to his presence even before he arrived at her desk. "Emergency staff meeting," he rapped. "My office, five minutes. Are Roth and Jacobs around?"

The secretary reached for her phone. "I think so."

"Well, get 'em here. Bernice too, as soon as she comes in. Hold all calls until further notice; I don't want to be interrupted for anything short of nuclear war. Got it?"

"Got it. By the way, Hugh Drysdale is in your office. He's been waiting about twenty minutes."

"Has he?" Harry glanced at his watch. "What's he want, anyway?"

Jeri shrugged. "He didn't say. Something to do with the investigation, I imagine."

"Well, I suppose I can give him a few minutes. Thanks." He opened the office door and went in. "Morning, Hugh."

"Oh, hi, Harry." The detective was standing by the office window, frowning; he turned quickly as Harry entered. "Listen, Harry, there's a couple of questions I'd like to ask you."

"Okay, but make it quick," said Harry, closing the door. "I've got a crisis on my hands here."

"Crisis?" Drysdale blinked. "What kind of crisis?"

Harry settled himself behind the desk. "A financial crisis, if you really want to know. Goddam Kesselman has withdrawn his offer."

Drysdale sank slowly into a chair. "But that means—"

"That means the company is broke within a month, barring miracles. Bankrupt. Finished. History."

The detective seemed unaccountably flustered. "But . . . but that changes everything," he murmured.

"You're telling me," Harry said dryly.

A knock came at the office door. "Come in," Harry called.

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The door opened and Walt Jacobs entered. "Hi, Chief. What's up?"

"I'll explain once everybody gets here."

"Say, Harry," Drysdale spoke up suddenly. "You mind if I sit in on this? It might have some bearing."

Harry shrugged. "Sure, why not?"

Roth and Wilder arrived momentarily. Harry closed the door behind them and then perched himself on the edge of his desk. "All right, people, here's the bad news." He outlined his meeting with Kesselman that morning, watching Roth's and Jacobs's curious expressions curdle in dismay. Wilder sat stony-faced throughout the recital. "So that's the situation," Harry concluded. "Comments, anyone?"

There was a moment of silence. Then, "Somebody talked," Jacobs said grimly.

"Obviously," returned Wilder. "But who?"

"Not me," the salesman shot back. His eyes raked the room.

"Nor I," Roth said defensively.

The financial chief became indignant. "Well, you don't think *I*—"

"Enough!" Harry shouted. He glared at the circle of his lieutenants. "I pay you people to come up with answers, not point fingers. The fact is that it happened. Now what are we going to do about it?"

"Hmm." Roth withdrew a cigarette from the pack in his shirt pocket, tapped it thoughtfully against his knee. "Have you considered a public stock offering?"

Wilder shook her head. "No good. It'd take months of preparation, putting together a prospectus, registering with the SEC, drumming up enthusiasm in the investment community. No."

The meeting ground onward. Various alternative schemes were proposed and examined. None proved able to meet the company's short-term demand for capital.

"Well, then," Roth said finally, twirling his still-unlit cigarette between his fingers. "It seems we must find a way of dealing with the venture capitalists after all."

"I'll go through my list of prospects one more time," Wilder promised. "But I warn you, I'm not expecting much. If Kesselman knows about Harry's problem, then probably they all do."

At that point Harry called a break for lunch. As the group dispersed he recalled the reason for Drysdale's visit. "What was it you wanted to ask me about, Hugh?"

Drysdale was standing at the corner of Harry's desk, ashtray in hand, staring down at the butt of Roth's cigarette. "Hmm?" He glanced up, setting the ashtray back on the desk. "Oh, nothing," he said absently. "Catch you later, okay?" He left abruptly.

Mystified, Harry picked up the ashtray to dump it. As he did so his eye was caught, just as Drysdale's had been, by the cigarette butt within. In fact it was not a "butt" at all. It was an entire cigarette, unlit, unsmoked, which Roth had stubbed "out" at the end of the meeting exactly as if he had really smoked it. Only he hadn't.

Harry was working late that evening when he heard Jeri's phone ring. He picked up his own handset and punched a button. "Aionos. Meisner."

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"It's Hugh Drysdale, Harry. Listen, can I buy you a beer?"

"I'm kind of busy right now, Hugh. What's it about?"

"I've got something to tell you."

Harry set down his pencil. "Something important?"

"I think so."

He knows, Harry thought. *He's got the answer*. His heart thudded. "Where shall we meet?"

Drysdale named a bar not far from the Aionos headquarters.

"I know the place," Harry agreed. "Fifteen minutes?"

"Right. See you there."

Harry made it with a couple of minutes to spare. Drysdale was already nursing a beer in a booth far back in the bar's dimness. Harry gave his order to the bartender, then made his way through the scattered tables to slide in opposite the detective.

"What have you got, Hugh?" he asked eagerly.

Drysdale met his gaze squarely. "I'm quitting, Harry."

"*What?*" Harry was stunned. "No. No. Wait a minute. Tell me what's going on here."

"I just told you," Drysdale said impatiently. "I'm dropping your case, I'm not going to work for you anymore."

"But—"

A waitress came with Harry's beer; Drysdale handed her a bill and she vanished back into the gloom.

Harry leaned forward, arms on the table. "*Why*, Hugh?"

The detective gave him a sad smile. "Sorry, Harry. I can't tell you."

"Don't give me that crap." Harry grabbed his glass and swallowed. "If you know something, I've got a right to know too."

Drysdale merely shook his head. "Sorry," he whispered.

Harry felt the room close in around him. His shoulders hunched, his armpits trickled with fear. "But you can't quit now, Hugh," he said weakly. "I need you to stop him, to protect me from him."

The detective's brow ceased. "Protect you from who, Harry?"

"You know." Harry licked his lips. "*Him*. My enemy."

Drysdale snorted. "Harry, I think you're taking this whole thing far too personally. I assure you that as far as I can tell there is no enemy, no plot against you of any kind." His grin flashed briefly in the darkness. "I hope you won't take it the wrong way if I say that you're surprisingly well-liked out there."

"But the aionometer—"

"Screw the aionometer!" Drysdale said with some heat. "I'm telling you, as one human being to another, if there's any real danger to you I can't find it."

"Look," Harry cajoled. "Suppose I offer you a permanent position. A vice-presidency, even. Sure; this kind of thing will happen to our customers, too; we'll need a good investigator on permanent staff. There'll be all kinds of benefits: life insurance, stock options, medical and dental coverage—"

"Harry." Drysdale's pitying look froze Harry in mid-spiel. "Thanks for the testimonial, but I just can't accept. I can't work for you anymore, contract or salary or any way at all. Is that clear enough?"

"But—"

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"No buts. I've made up my mind." He reached down beside him and hefted a thick binder onto the table. "Here, this is for you."

Harry eyed it disinterestedly. "What is it?"

"My file on your case. I figure I owe you that much, anyway." He downed the last of his beer and stood. "I have to be going now. But listen, Harry—"

Harry looked up. "Yeah?"

A warm hand came down on his shoulder and squeezed. "Take care of yourself, you hear me?"

Day 26: Friday

Harry called in sick the next morning. In actual fact he felt perfectly fine, physically. Emotionally, however, he was far from ready to deal with the world. Immediately upon arising he made a tour of the house, ensuring that all doors and windows were locked, all shades and draperies drawn.

He then turned to his kitchen in search of breakfast. Unfortunately the supplies were sketchy: one egg, a couple of stale heels of bread, half a scoop of instant coffee. No juice, no bacon. And only a pale smear of butter left in the bottom of the dish. He thought briefly about going out to eat—then the fear hit him and he quickly rejected the idea. Grumbling, he made do with what he had.

Afterward he settled himself in the living room, the heavy bulk of Drysdale's report on his lap. *Is it in here, Hugh?* he wondered. *Whatever it is you found . . .* Lower lip clenched between his teeth, Harry thumbed the volume open.

His own face stared back at him from a photocopied newspaper clipping. The caption identified him as HARRY MEISNER, VICE-PRESIDENT; the accompanying article described his promotion to that position from divisional manager. That had been five years ago, back at Bateson OmniTech. He flipped the page; there was another clipping announcing his engagement to Meredeth Knudsen. Several pages farther along was the notice of their divorce.

Harry thumbed again, delving deeper into the file. There was a copy of his life-insurance policy, listing Aionos Incorporated as beneficiary. Again: the original partnership agreement between Harry and Mel Roth, as amended to reflect Kesselman's 33 percent ownership. Again: a typewritten transcript of last week's hypnosis session.

"Huh."

Harry had almost forgotten about that session. Now the memory of it came back to him in full: the soothing sound of the hypnotist's voice, the various danger scenarios he had acted out, Drysdale's odd reaction on the question of the smoke detectors—

Harry blinked, flipped pages, searching. There:

. . . turn it off. You're okay this time, but you decide to order a complete smoke detector system for the whole building, and for your home too, just in case.

M: *No.* [Momentary alarm indications. M does not appear to have noticed.]

D: *Huh? Harry, did I hear you right? Will you order the smoke detectors as suggested, or not?*

M: *No.* [Momentary alarm indications, as above.]

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D: *Damn. There it is again.* [Pause.] *Think carefully, Harry. Why not?*

M: [Pause. Extended alarm indications.] *It doesn't feel right.*

Harry looked up, breathless. He had no recollection whatever of the aionometer alarms recorded in the transcript. —Or had he? That vague feeling of unease when Drysdale pressed him for an explanation . . .

In his mind's eye Harry saw Walt Jacobs in running shoes, saying, "It gives me the creeps," while against his naked chest the aionometer flashed red . . .

Harry shivered, his mind veering away from the image. Stubbornly, he forced it back into focus. *The alarm is guaranteed to be exactly intense enough to affect Smith's behavior,* Roth had said; *no more, and no less.* Harry felt a powerful urge to turn on the TV and lose himself in some inane soap opera. He fought the urge, his hackles coming slowly erect. *But nobody ever said Smith has to notice it consciously,* he realized. *Once you've got the habit of responding, the whole process can be subliminal.*

The electric thrill at his collar told Harry his reasoning was correct. He yanked his aionometer out of his shirt and keyed in the muting sequence. Then he fell back in his chair as the command took effect and the pressure on his neck let up.

So. The aionometer didn't want him to install smoke detectors, or even to know why he shouldn't install them —something Harry very much wanted to know. *Who's in charge here, anyway?* he asked himself heatedly. *Me? Or the damned machine?*

Harry growled. He knew the answer to that one. By God, he *would* install the detectors, risk or no risk. It might be the only way to learn the truth about this damned deadline he faced.

It was later that afternoon that Wilder called him with the news. "Chief," she said, "you've got to get down here right away. I think I may have found someone to help us with our finances."

Harry's knuckles whitened on the handset. "Who?"

"A certain Dr. Raymond Brewster, a retired heart surgeon now living in Woodside. He's shown some interest in our product in the past."

"Have you talked to him recently?"

"No, he's been on vacation in the Bahamas for the past month. His secretary told me he was due back last night."

"Then he doesn't know—"

"As far as I can tell, he doesn't know."

Harry took a deep breath. "All right. Tell Jeri to get us an appointment. Today. Now. I'll be ready as soon as I can."

Day 29: Monday

The full moon was well past the zenith when Harry pulled his car into the driveway and eased his tired body out. *The old goat sure knows how to celebrate,* he told himself as he stumbled up the walk to his front door. Harry had confined himself to beer and mineral water throughout the evening, in keeping with his hypnotic oath; nevertheless his stomach churned, his throat rasped, and his bladder strained to near-bursting

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with the aftereffects of too much food, drink, and general good-fellowship.

All this on top of three tense days of grueling and sometimes short-tempered negotiations. *But we did it!* he exulted silently. *By God, we—*

His foot thumped against an oblong darkness near the doormat: the evening paper. He stooped gingerly to pick it up, then fumbled his key into the lock and went in. Briefcase and jacket he dumped on the nearest chair; the newspaper went with him to the john.

Squinting in the bright fluorescent glare, he struggled to refold the paper one-handed to the business section. Ah, there it was, in objective black-and-white:

> NEW FUNDING FOR AIONOS
>
> SAN JOSE —Aionos, Inc. today announced the sale of a 25% interest in the company to Dr. Raymond Brewster, a private investor, for the sum of $2 million. The San Jose-based company plans to use the money to manufacture and market a line of "personal security systems" scheduled for release later this year. . . .

Harry's eyes blurred; he blinked and set the paper aside. *Twenty-five percent*, he thought sourly. *And I thought Kesselman's terms were unreasonable.* Then he pushed the thought aside. *What counts is that we did it, we struck a deal. The company will live.*

Flushing, he zipped his pants and returned to the living room to lock up for the night. Overhead, a newly-installed smoke detector flashed silently as it sampled the air for contaminants. A second detector monitored the bedroom; Harry cast an oblique glance at it as he undressed. *Fat lot I've learned from those so far*, he reflected. *Well, give it time.*

He was brushing his teeth when the alarm hit.

It was the most intense he'd ever felt, an electric jolt that lit his nerves from scalp to shoulder blades. Simultaneously a piercing electronic scream filled the air. *Fire*, he realized dimly. *Got to get out . . .*

He stumbled from room to room, hands over his ears, the aionometer's prickle playing mercilessly up and down his spine. On the front lawn he paused, managed at last to mute the alarm. His shoulders relaxed; he straightened up slowly, breathing deeply of the night air, listening to the sound of the siren—

And immediately ran back into the house, to the control panel in the kitchen. *Of course! There's no fire here. It's the remote signal from the detectors at the office!*

He punched a cutoff and the siren died. Then he headed for the phone and dialed. One ring . . . two . . .

"Hello?" Roth's voice came blearily through the receiver.

"Mel! Mel, it's Harry. There's a fire, Mel, down at the office."

"What!" Roth was wide awake now.

"A fire, at the Aionos offices. I just got the signal. Listen, I'll call the fire department and meet you down there, all right?"

"All right. No, wait a moment, Harry. What does your aionometer say?"

"Quiet as a mouse, Mel," Harry lied. "Look, let's not waste time. I'll see you there." He depressed the switch hook, released it, and dialed 911.

"It must have started in the lab," Roth shouted over the blaze. "The

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whole west end of the building is on fire."

Harry stood beside him, watching his dreams turn to ashes. "At least you've still got that extra set of research notes at home," he yelled disconsolately.

Roth's face froze. "Harry—"

"What, Mel?" Harry looked at him, and his gut clenched. "Mel! They are at home, aren't they?"

"I'm sorry, Harry. It's my fault. I should have given Jeri the originals to transcribe, and kept the second set safe."

"You mean they're *in there?*" Harry screamed at him.

Roth nodded miserably. "In Jeri's filing cabinet. I saw them there myself on Friday."

Harry's head jerked around. "In Jeri's files, did you say?" His eyes darted to the dark eastern wing of the building. His fingers twitched.

Roth looked at him strangely. "Harry, you're not thinking of going in after them?"

"You bet I am. Those notes could mean the company's survival."

"Harry, don't be a fool! This is *it*, don't you see? The danger that's been waiting for you. It's madness to go in there after all the care you've taken."

At the back of his mind Harry knew he was right. The gold chain pulsed like fire around his neck, proof enough of Roth's assertion. And yet in a sense it was precisely this that drove him—the need to resist the dictates of the machine, to take charge of his own life at any cost.

His resolve hardened. "What can I say, Mel? I've got to do it." He turned toward the blaze.

Roth grabbed him, held him back. "Wait, Harry." He took a deep breath. "Let me go. I know exactly where the notes are filed; I can be in and out of there in thirty seconds."

Harry shook his head. "Sorry, Mel. You're too valuable to the company. We can't risk both you and the notes. I go."

"But, Harry, *it's no risk for me!* Look!" Roth pulled forth his own aionometer and held it up. The metal casing glittered dull orange in the firelight, in stark contrast to the green indicator glowing serenely in the corner. "The aionometer doesn't lie, Harry. I go."

"Not a chance. *That's* why there's no risk for you. Because you're staying right here."

"But—"

"Think about it, Mel." Harry's will radiated fiercely, like the heat at his back, silencing Roth with its intensity. "You know I'm right. Like you said, the aionometer doesn't lie."

The engineer wavered, fell back a step, the machine still clutched uncertainly in his fingers. Harry held his stare a moment longer, then turned, smiling in cold triumph, to face the growing heat.

Abruptly, unpredictably, a siren wailed, somewhere near at hand. Harry looked around wildly for the source of the sound, his control broken. In that chaotic moment, Mel Roth rushed past him, knocking him to the ground.

Harry struggled to his feet, his own aionometer suddenly quiet. "Mel, no!" But the engineer ignored him, yanking open the glass door. Smoke billowed out into the night; Roth pulled his shirt up over his head and vanished within.

Harry's gaze remained riveted to the door. Seconds passed like geologic

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cuts. "Come on, Mel."

With a roar, the roof fell in.

"Oh, God!" Harry cried, stricken. "*Mel!*" He ran forward, but his aionometer jolted, throwing him to his knees. Something glittered on the ground before him: Roth's machine, discarded, its indicator dark and inscrutable. Harry reached out for it, and was suddenly surrounded by lights, engines, babbling voices. A yellow-slickered figure ran up to him, one booted foot heedlessly grinding the fragile device into the pavement. "Okay, mister, come on, get back." The woman applied an efficient arm-lock and began dragging Harry away from the fire.

"Wait!" Harry struggled frantically against the firefighter's grip. "Mel!"

"Who's Mel?" The woman's eyes followed Harry's outflung arm. "You mean there's somebody in there? Christ!" She released her grip, dropping Harry to the pavement. "Mike!" she bellowed. "Get that wagon over here! We got a man inside!"

Numb, Harry crawled to a haven at the edge of the commotion. Leaping firelight made the scene surreal; he turned his eyes away to the surrounding darkness. Far off across that darkness he saw a pair of twin headlights spring into being. They started to move, mindlessly he tracked them as they passed beneath a streetlight and the shape of a blue-and-white VW van stood revealed. Harry gaped after it until it turned a corner and was gone.

"Stretcher! Where's that stretcher, dammit?" The voices swelled again in Harry's awareness.

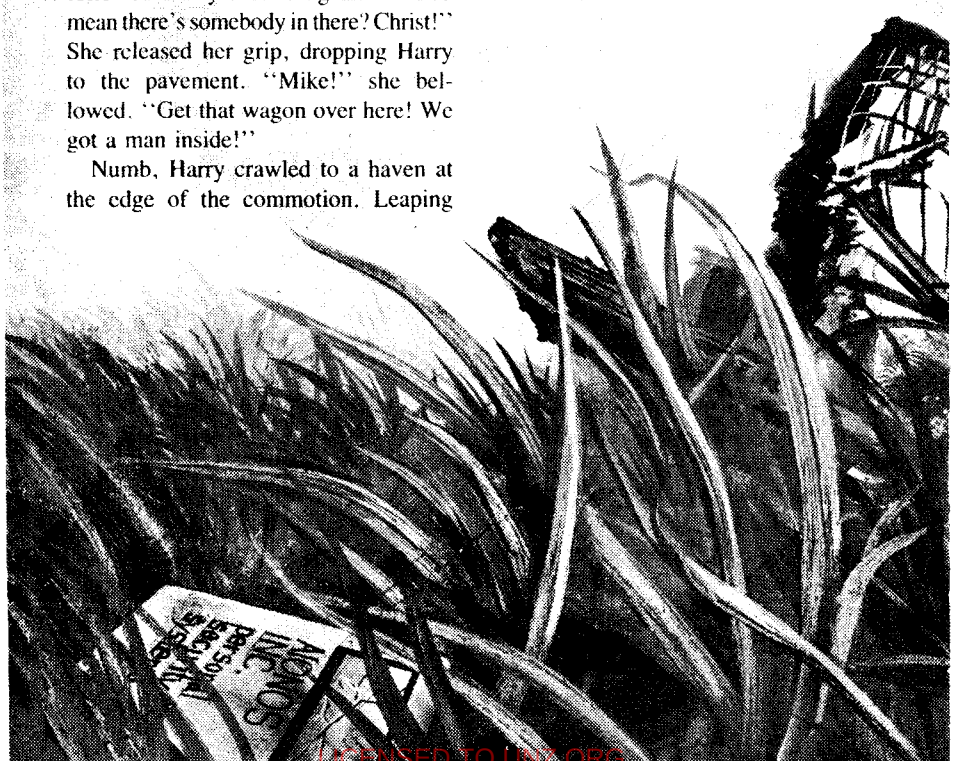
"Jesus! Is he breathing?"

"Dunno. Don't think so, though."

"He's burned pretty bad."

"Here, grab his other arm, will you? Careful—"

White light flared in Harry's face. "What about this guy? He looks like he's in shock."



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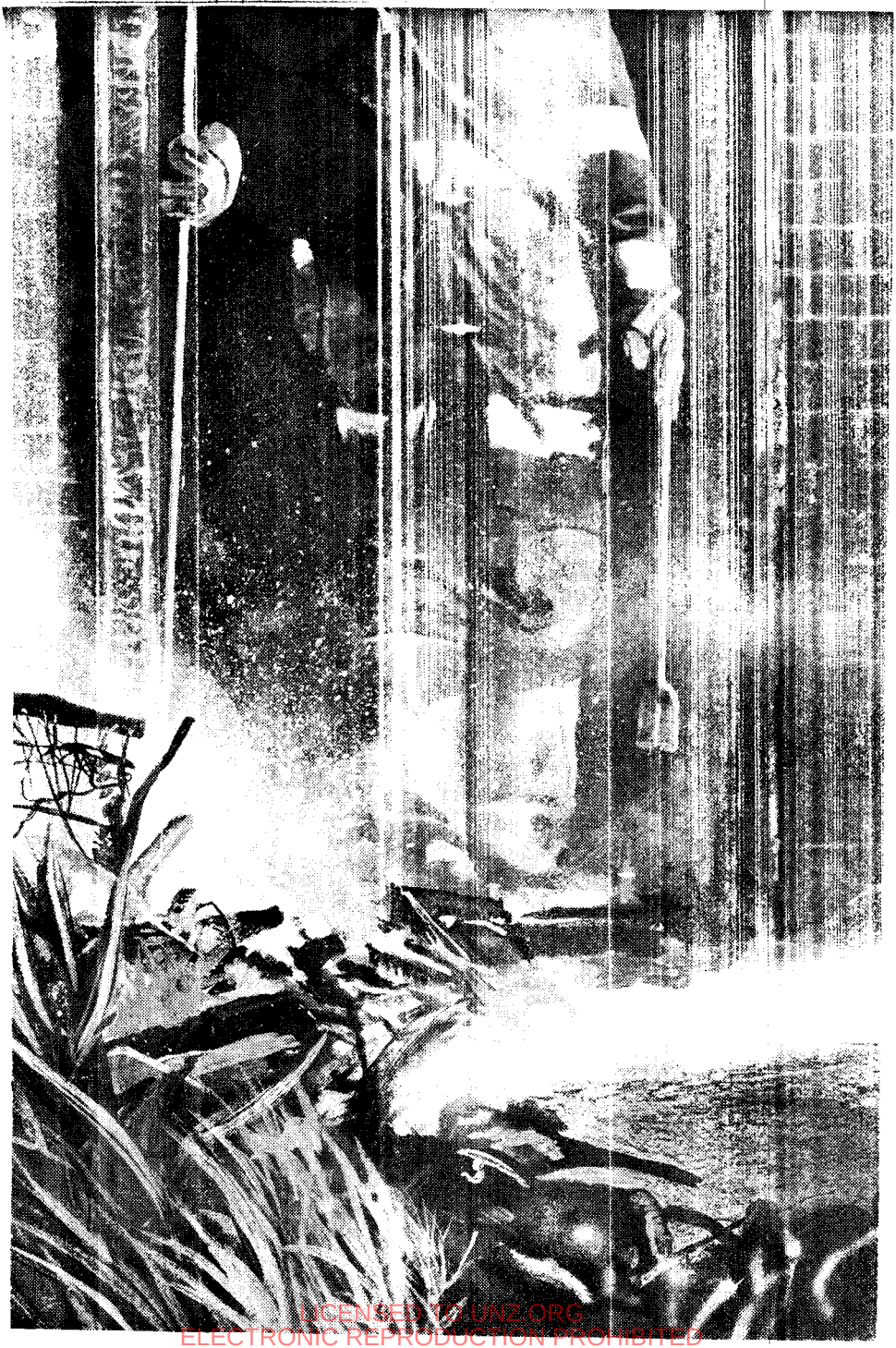

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"Give him a hypo and pack him along. He's not doing anybody any good here."

Day 41: Saturday

A suburban street. Harry cruised slowly, reading off the house numbers: 6045 . . . 6047 . . . Ah, there: 6051. He pulled over to the curb opposite the VW, turned off his engine, and sat, thinking, for a moment. Then he got out of the car and walked up to the paneled door.

A young black girl answered his buzz. "Hi."

"Hello. Is your father home?"

"Sure. Hang on." She vanished back into the house.

Moments later Drysdale appeared. "Yes?" he said blankly. Then he looked again, and smiled. "Harry! I didn't recognize you without a suit on."

"I don't wear suits much any more, Hugh."

"Oh." There was an embarrassed pause. "I, uh, I heard about the fire. Was it bad?"

"The insurance company won't pay, Hugh. They think it was arson."

"Is that right?" Drysdale's voice was carefully neutral. "What do the police think?"

"The police aren't sure. Oh, they'd like to be able to press a charge, but there's not enough evidence. There's not much of *anything* left down there, Hugh."

"I see." Abruptly Drysdale stood back from the doorway. "Well, come on in. We were just taking it easy out back, enjoying the sunshine. Get you a drink?"

"No, thanks," Harry began automatically. Then, changing his mind, "Sure, what the hell. Bourbon and soda, if you have it." He managed to work up a dry chuckle. "One of these days I'll get around to having all those compulsions you put on me reversed, now that my life expectancy's back up to normal."

Drysdale smiled uncertainly. Harry glanced out through plate glass to where a petite dark woman sat in a lawn chair in the shade, her two daughters sprawled in the grass at her feet. A game board of some kind was set up between them; as Harry watched, the older girl drew cards and moved a marker around the board. Play money changed hands.

"Here you go, Harry."

"Hmm? Oh, thanks." Harry accepted the glass and turned away from the window.

Drysdale's eyes went from the scene outside to Harry's face. "We'll talk in my study."

Harry nodded and followed the detective down a short corridor. The study was sparsely furnished in antique oak, clean-lined and solid. Harry settled into a leather-covered armchair while Drysdale took his place at the desk. A window let in a narrow view of the back yard.

"How's Mel Roth doing?" Drysdale asked softly.

For an instant Harry was back in the ambulance, experiencing again the steely sharpness of the stimulant in his bloodstream, the gut-grabbing stench of his friend's roasted flesh. He grimaced and took a long pull on his drink to dispel the image.

"Mel's dead, Hugh," he said raggedly. "Six days in intensive care before the fluid loss killed him. He never

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did regain consciousness."

The detective's eyes closed. "I'm sorry," he whispered.

"It should have been me," Harry continued. "It was my fate, my *aion*." He shuddered, remembering. "If that siren had been even five seconds later . . ."

There was a long silence. Then, "What do you want from me?" Drysdale said tightly.

Harry raised his eyes, looked his opponent full in the face. "I want to know *why*. I saw your car there, Hugh, the night of the fire. By rights I should have gone to the police. But because we were friends, I thought I'd see you first."

"Oh, Lord." Drysdale's eyes sought the window, his family's haven beneath the trees. "I don't know if you'll understand it, Harry."

"Try me."

Drysdale hesitated, sipped his drink. "All right." He straightened up in his chair, setting the glass back on his desk. "You mentioned fate just now, *aion*, as if you really believe in it. Do you?"

Harry shrugged, ice cubes clinking. "A month ago I would have said no way. Now—" He paused. "Now I'm not so sure."

"Well, I'm sure," Drysdale declared. "I believe in free will, that a man is in control of his own destiny." He frowned, dissatisfied. "Put it stronger: I believe that a man *should* be in control of his destiny—that if he sees something happening to take away that control, he has the right and the *obligation* to put a stop to it."

"You think the company was a threat to your free will?"

"I know it was, Harry. So do you, if you stop to think about it." Drysdale leaned forward intently. "What made Mel Roth stop smoking? Say it another way: what made him stop lighting the cigarettes he continued to buy and wave around, just like he was still smoking them?" The detective's eyes narrowed. "You know, Harry."

A familiar sense of foreboding came over Harry, making him want to stop listening, to shut his ears and run from this man and his unpleasant truths. But by now he knew that feeling for what it was. "All right!" he said angrily, the gold chain buzzing his flesh. "The aionometer did it."

Drysdale nodded slowly. "You see how hard it is to go against the machine's orders? How much easier it would be just to give in and pretend it was your own idea all along?"

Harry rubbed his neck sulkily. "Okay. So maybe you're right, maybe the machine has some bad side effects. But, Hugh, why didn't you say something? We could have worked something out."

Drysdale snorted. "Like what? Stop producing them? Shut down the company? Be realistic, Harry."

"Hm." The man had a point. "So you decided to shut it down yourself."

"Actually, no. Not right away. I figured with all the financial troubles you were having, I could just step aside and let nature take its course. And you know, it almost happened that way."

Light dawned in Harry's brain. "Brewster. The item in the paper."

"Uh-huh. That was something I hadn't figured on. But as soon as I heard about that deal, I knew I had to stop it from going through. *Had* to. I won't have my kids grow up to become robots, Harry, controlled by a damn machine and not even knowing that they're being con-

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trolled. And that's what your company would have done to them."

"*If* the product was successful."

"You're the businessman, Harry. You tell me. Would it have been successful?"

Harry's eyes fell. "Yes, dammit," he whispered, the ghosts of all his dreams before him. "It would have been fantastic."

For a long time no one said anything. Then Drysdale spoke up softly. "Harry, you can't know how sorry I am about Mel. I never planned for anything like that to happen."

"I believe you," Harry told him. Then a thought occurred to him. "But suppose somebody starts it all up again? I could do it; I've still got this—" He tapped the aionometer resting behind the open vee of his collar. "—and so do Wilder and Jacobs."

"Walt and Bernice?" Drysdale waved a dismissal. "Oh, they won't do anything."

"Why not?"

"Because it would mean taking the machine apart. And it won't let them do that. Bad for the lifespan, you know. It'll carefully guide their thoughts so even the faintest hint of such an idea will be turned aside. And they won't even know it's happening." He shook his head. "No, they're married to those machines for life, I'm afraid."

"But—but that's awful, Hugh! Shouldn't we do something? Try to warn them or something?"

Drysdale laughed unpleasantly. "Go ahead and try, Harry. I did. You won't be able to get near them. The aionometer sees you coming through the crowd, and steers its steed the other way. It knows who's calling even before you start to dial, and makes sure its owner isn't home. It has all the possible realities to play with—and it prefers the ones in which you and I are just a fading memory."

A quiet knock came at the study door. Drysdale rose and opened it.

"Dad?" It was the older daughter. "Mom says it's time for lunch soon. Is your friend going to eat with us?"

"Uh, no, thanks," Harry said, rising. "I ought to be moving along anyway."

"You're sure?" Drysdale asked him. "You're quite welcome, you know."

"No, that's okay, Hugh," Harry demurred. "Thanks anyway."

Drysdale shrugged, turned to his daughter. "Tell your mother I'll be right there."

"Sure, Dad." The girl skipped away down the hallway. Harry and Drysdale followed at a more leisurely pace. At the front door Harry turned back to his host and said, "Thanks for the explanation, Hugh."

"Thanks for asking for it," Drysdale said sincerely.

There was a moment of tense silence.

"So what will you do?" the detective pressed.

Harry glanced up and down the street, considering. A faint tingling began at the back of his neck; absently his hand went up to encircle the metal case of his aionometer. The tingling increased.

"Oh, I don't know," he said. His hand tightened. There was a final brief flare of protest at his neck, then the golden chain parted and he was free. He dropped the electronic albatross in Drysdale's open palm and shrugged. "Survive, I guess." ■

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on gaming

Matthew J. Costello

I remember when they dug up Avenue H in Flatbush, Brooklyn. Suddenly, the big street next to my house was changed into a broken-up landscape of foxholes, rubble, and large, weirdly-shaped chunks of asphalt. Now my runny-nosed friends and I had the perfect terrain for re-enacting engagements between Flash Gordon and the scantily-clad forces of Ming the merciless.

It was heaven.

Unfortunately, they eventually repaved the street and Planet Mongo disappeared, replaced with a civilized boulevard and double yellow line.

Enter *Photon*. Photon hopes that there are millions of kids and nostalgic grown-ups who long, once again, to wield a ray gun. *Photon* is nothing less than an attempt to make space-age battles as much a part of the American recreational scene as bowling or miniature golf. After debuting in Dallas in 1981, Photon has grown to where there are now seven units operating. Photon Marketing, Ltd. hopes to have a franchised unit in every state by the end of 1986. And, with a cartoon series in the works and a host of licensed *Photon* merchandise, they just may do it.

What is *Photon*? Designed by George S. Carter III, it's a life-sized space battle where two teams prowl a futuristic terrain zapping each other with light guns and attempting to attack the enemy team's base. Eventually there will be a national tournament with players competing for a grand cash prize of $100,000.

One Saturday night recently I investigated the Photon unit located in Kenilworth, N.J. Accompanied by Bill Battista, Associate Publisher of *Analog*, we put on our sneakers and set out for Planet Photon.

The building that housed the game looked like a small airplane hangar, and the neon signs inside have a 1930s futuristic look that's more art deco than high tech. First we had our photo I.D. prepared (which has a one-time fee of $10) and then we signed the release form. *Photon* is a very safe game, though, and the release form is merely a precaution.

A game lasts 6½ minutes (I wonder why one-half a minute?) and costs $3.50. Before you enter the Photon battlefield, a 10,000 square-foot maze of ramps, portholes, tunnels, and battlements, you must suit up. You put on the Photon helmet which has stereo headphones that signal your hits and misses. Then you strap on a really hefty battery pack, a control module that records your hits and informs the central computer, and the photon Phaser, a Clint Eastwood-sized handgun that could use a better sight.

All this gear is heavy, and the helmet sits pretty uncomfortably on your head. While there's no gravity in space, all this stuff makes for quite an earthly load.

(continued on page 176)

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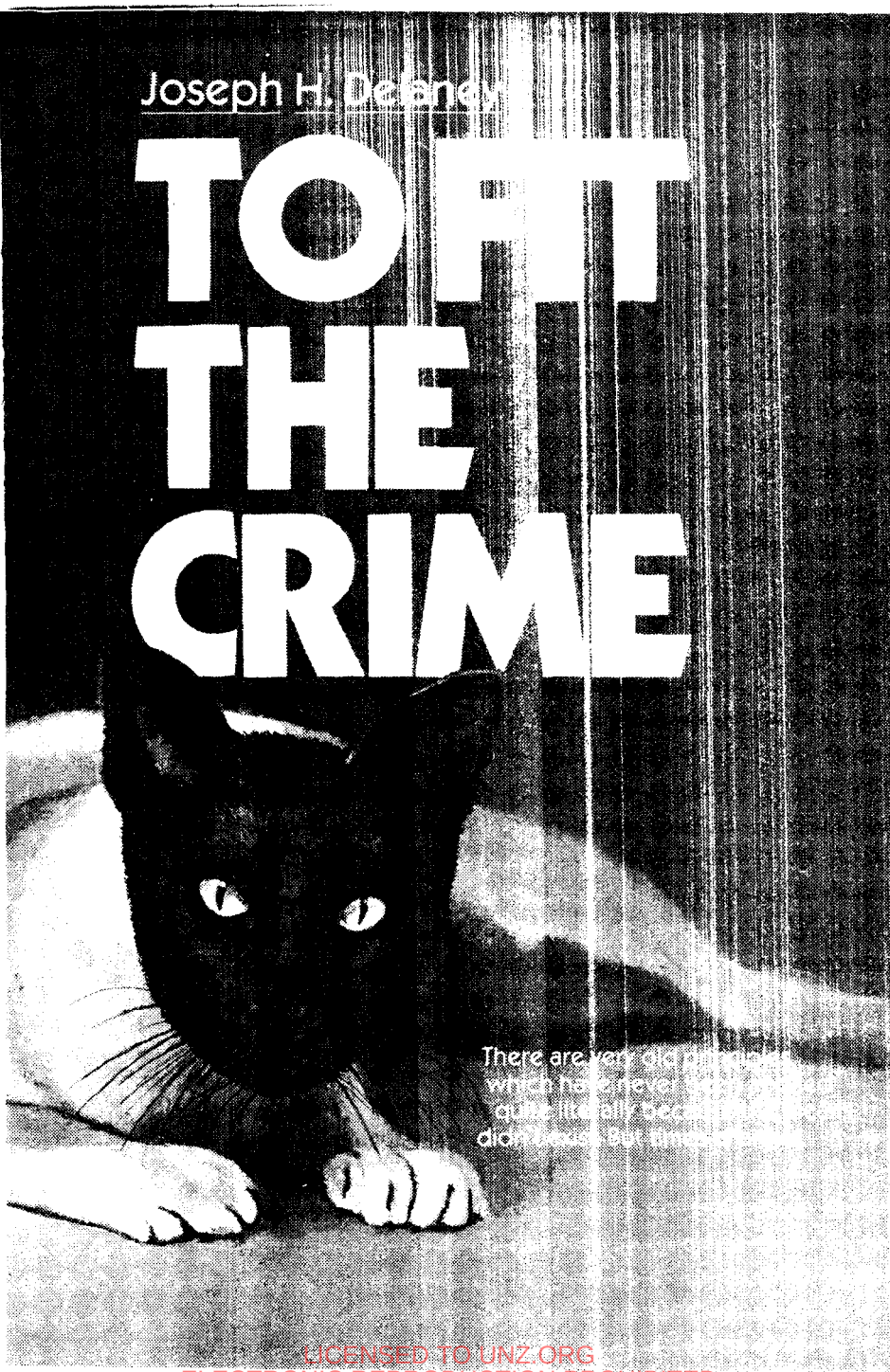
Joseph H. Deeney

TOAT THE CRIME



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It seemed like hours had passed since the technician had said, "OK, Mr. Pedeza, we're done. You can get dressed now."

Les had done just that, then retired to the anteroom to which the lab receptionist had directed him. He had waited ever since, browsing casually through a stack of National Geographics older than he was; waited for Dr. Proctor to complete his morning surgery and come over to check the test results.

He had just looked up from the magazine that lay across his lap, intending to rise high enough to see through the glass panel and check the time on the wall clock. He did not do this—he was distracted by the falling of a shadow across the frosted panel in the anteroom's door.

An instant later the door opened, and Dr. Sam Proctor walked through. His right hand held a narrow fanfold printout. On his face there was no clue to tell Pedeza whether he regarded the news as good or bad.

Up until that moment Pedeza had managed an uncomfortable but rigid control of his emotions. He lost this at once, and panic rose like a floodtide. The magazine he had been leafing through slipped off his lap and swished to the floor. Les hurriedly reached down to retrieve it.

By that time Proctor was in the room and pushing the door shut behind him. He plopped down in the chair opposite Pedeza, and with wrinkled brow perused the test results for a moment more before he spoke.

Pedeza was too impatient to wait any longer. "The news is bad, isn't it?" He blurted.

"Moderately," Proctor replied gravely. He turned the fanfold one more page and cast a furtive glance at it. "But it could have been a whole lot worse," he continued, almost without pause. "This could have happened a year ago, instead of today. If it had, all I could do would be to advise you to get your affairs in order and enjoy what was left of your life."

"And now?" Pedeza's voice was squeakily plaintive.

"You've got nine chances in ten of dying from something else than what ails you now. The tests show you're a sympathetic. As soon as we can find a donor, and that should be only a day or two, I'll go in, slice out your old pancreas, and plug in a new one. You'll be back home in . . . in—"

". . . Buzzard Guts—"

". . . in Buzzard Guts, by the end of the week."

Pedeza gave a sigh, but he couldn't make up his mind if it was relief or astonishment. "That soon, huh? Seems like I was laid up lots longer when I had my appendix out."

"You were a child then?"

"Yes."

"Things are different now. Twenty or thirty years ago, a transplant like you'll have would have been unthinkable. Now almost anything goes, for most of the population, anyhow, thanks to a couple of miraculous developments. You're lucky to be a sympathetic—that's ninety-five percent of it right there."

"I never quite understood what that meant."

"It derives from the fact that a few people have systems that aren't. When I said that this would have killed you

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a year ago I meant that the specific organic suppressant I'll use on you wasn't available then, and the chemical suppressants would have been too clumsy. The only chance you would have had would have been an almost perfect genetic match. Now, it doesn't make any difference, because we can force the organ, and your system, to come to an accommodation with one another."

"You don't have to be picky about donors."

"That's it, essentially. The sympathetic, or 'specific' suppressant was the result of a new approach. With one exception, the body treats all tissue except its own as an invading enemy. That exception is, of course, the tissue of reproduction, the sperm and the egg. A hostile reception for the sperm would have doomed the race to extinction, and there are isolated cases where it does just that in individuals, even after ten thousand generations of culling.

"When we discovered how these cells did it we were able to apply the method to older tissue, and virtually eliminate tissue matching as a consideration for transplants. And just to show you how far we've really come, let me tell you about what I saw over at Baylor the other day—that was really far-out."

"What was it?" Pedeza asked, not so much out of curiosity but from need of a distraction. He appreciated Dr. Proctor's confidence but didn't entirely share it.

"Two cats, Mr. Pedeza: one with a pure white head and a black body, the other with a pure black head and a white body. And aside from being a little clumsy, they function normally."

"They switched them!" Pedeza's curiousity *was* excited now, and the fact that modern medicine could do *that* argued mightily for the success of his own forthcoming surgery.

"Yes. Of course, there's a long way to go before it'd be safe to try something like that on a man, but it's in the future somewhere. And again, without new materials to match the new surgical techniques—in that case an organically based adhesive which I'll be using on you—no amount of skill could have accomplished what I saw."

"Amazing," Pedeza replied. "I think I might like to take a look at those kitties myself someday."

"I'll see what I can do, Mr. Pedeza," Dr. Proctor replied with a smile.

But he didn't. Sam Proctor was a busy man, even though he took care to spend the necessary time to reassure his patients, as he had done with Les; and once it was apparent to him that Pedeza would hold up he deftly steered him out of the waiting room and into the clutches of assistants who understood his methods.

Thus it was that Pedeza soon found himself alone with a nurse who was making arrangements to check him in for surgery. After that, things went swiftly, smoothly, and largely outside Pedeza's knowledge or control.

The surgery itself was ultimately successful, and though Proctor did not keep his promise, and Pedeza never saw the cats, he did remember the story.

"Hey—hey Crumb-bug—you gonna snore all day—wake up, we gotta get some gas someplace." Yancy Hinson picked up the sawed-off shotgun that lay

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across his lap and gave his partner in crime a savage poke in the ribs.

Louis Hardeman did not like to be called Crumb-bug, nor did he like being pushed, especially not while he was trying to sleep and especially not with gunbarrels. Quick to anger under any circumstances, a fire rose in him—and despite the fact that it had been kindled only an instant before, it blazed furiously in that interval. By the time he had risen to a seated position, ready to assert himself, there was a .44 Magnum in his hand. Its muzzle came to rest on his companion's temple, parting the long, greasy brown hair, and leaving a red streak behind it wherever it moved.

"We're doing 80 miles an hour down a mountain, Crumb-bug. You gonna shoot, go ahead—shoot."

The weapon fell away, as Yancy had known it would. Hardeman was impulsive, but he was also yellow. Baiting Hardeman was one of his favorite pastimes because of this, and despite use of such a heavy hand, Hinson regarded Hardeman as the finest lackey he ever had.

"Where we at, Yancy?"

"Who knows. Someplace in the boonies."

"Still in Arizona?"

"Texas—east of El Paso. You slept right through it."

"You shoulda stopped there. We coulda got a room."

"With what? We're about outta money."

"There's credit cards."

"Not for a motel—uh-uh; when you use a hot card you wanta be movin'. Don't you know anything, Crumb-bug?"

"I know you better stop callin' me that, because if you don't I'll blow you away, you hear?"

"Feisty, aintcha. Got any money?"

"Coupla bucks. Maybe enough for a hamburger. How much gas we got?"

"Not enough to go very much farther—not in this. We should be able to get to a town, though. There's one ahead called Buzzard Guts. You should have picked something that gets more mileage."

"Me? How was I supposed to know we were gonna have to go this far? It was great around L.A." And that was excusable. After all, they'd started out innocently enough on their routine Saturday night carousing, picked up first the car, and then a couple of girls. And then a nosey cop had stopped them and said they didn't look like they went with the car, and tried to check to see if that was true. He was a handful, even for them, and managed to get a description and a license number on the air before Hardeman shot him. They were stuck with the car, though. There just wasn't anything else around that could have made it where they now had to go, though they managed to pull a set of plates off an old Chevy that was stalled a little farther down the road.

"We ought to get rid of it anyhow, now that it's daylight again—get one that won't be so easy to spot—something with Texas plates, so we fit in—"

". . . And that they can check real easy."

"They can check 'em all easy, with computers. Best way'd be to buy one if we could."

"Maybe we could hit one of these hick town banks."

"That's the kind of talk I woulda ex-

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pected out of you, Louis. Look around—you see anything 'cept mountain and road. Tell me, where are you gonna find a bank out here?"

At that instant the car's engine sputtered. One last dollop of fuel, thrown into the line by the lurch, caused it to catch again, but only briefly. After that, engine compression promised rapidly to bring it to a halt.

Yancy threw it out of gear, allowing gravity to momentarily bring the speedometer needle back up to 80. When it threatened to go beyond he began touching the brakes lightly. "Think fast, Crumb-bug. We can coast for a while but not forever. When we get to the bottom we're gonna have to think of something."

Hardeman did not reply. He gawked around, trying to spot something that might signal the presence of civilization as he knew it. There was . . . nothing: only sparsely grown mountains of broken limestone—old mountains, low mountains by his standards, but wilderness to him.

Around the slowing Cadillac what other traffic there was whizzed by, unknowing, uncaring that the two of them were in trouble. Eventually, the force of gravity was spent, and the car came to rest at the bottom of a long grade. For a while after Yancy had pulled off on the shoulder the two merely waited inside, looking ahead, to see if anybody would stop and offer aid.

Nobody did, and by and by it began to dawn on them: nobody would. "Notice that, Crumb-bug?"

"I told you to stop calling me that, Yancy."

"Yeh—OK—but have you noticed how they slow up, and gawk, and then go on?"

"Yeh? Well, what do you expect? Two guys that look like us—in this car—and California plates; would you stop?"

"I'm not stupid. Of course not. The only people we're likely to see if we stay here are the po . . ."

". . . Whatsamatter . . ."

". . . lice!"

The .44 was in Hardeman's hand and the hammer was back, so Yancy took a big chance making a grab for it. Nevertheless, he didn't hesitate. Louis was just completely unmanageable unless you got physical. He was an animal, and force was all he understood. "Put that away, Crumb-bug. He's gonna stop behind us. If he sees it he'll call on his radio and have a dozen cops here to help him."

"He's already on the radio. He's callin' in the plates. You know what that means."

"Yeh, I know. I'm gonna stop him. Gimme your gun?"

"No."

"I said gimme. I need the firepower. You can take mine. It won't make much difference anyway, unless I get him."

"What are you gonna do?"

"I'm gonna get out and walk over to his car. If he's not smart enough to draw on me first I can shoot him through the door, and then we can take his car."

"Take a cop car! Are you nuts?"

"We wouldn't need it very long—just long enough to stop somebody else and take theirs. After that they wouldn't know what to look for. Now, come on—hurry!"

Hardeman handed Yancy the pistol,

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and watched him turn, slip it into his belt at mid-back, then open the car door and step out. With trembling hands, he groped across the front seat for the shotgun.

Outside, Yancy was moving fast, skinny, bandied legs outlined when the stiff wind blew his pantlegs. He squinted through grit-rimmed eyelids at the squad car. The center of the windshield was a blaze of glare from the morning sun, so that he could not see clearly, but the outline of the broad-brimmed hat on the trooper's head indicated his posture and suggested he might still be on the radio.

To Yancy, this was encouraging, as well as the fact that he was coming in on his target out of the sun. The glare would mask his movements, permit him to advance so closely it would be impossible to miss. And he dared not miss because if he did, and the cop got word out, the rest of them would swoop down on the two fugitives and scoop them up.

Yancy had no doubt of his fate if that happened. He was in some jeopardy even now, even if they got away clean from this guy, because the police back in California had a general description and three barely cold bodies they could connect to this car: the cop, and the two girls, killed and left in the desert outside San Bernardino, because they were witnesses to the killing of the cop. Yancy plodded forward resolutely, determined to live his natural span if at all possible. If only this pig stayed put a few moments longer.

Yancy was only a couple of steps away when the cop started to get antsy. He didn't want this to blossom into full blown alarm and so he yelled out to the cop, "we ran out of gas. Can you help up get some?"

And for an instant he thought maybe it was going to work, and that the cop would simply think he was a traveler in trouble. But this lasted only until he saw the cop's right hand dropping, and his body leaning toward the left, even as a crack opened between the door and its sill. Yancy didn't wait any longer. He whipped out the .44 and fired a shot through the advancing steel slab, which struck it a handsbreadth below where the glass erupted.

The sound was deafening, the shock even worse. Everything in Yancy's vision went into slow motion: the writhing body of the cop, whose face was now contorted in pain, his rising right arm, from which a nickel-plated .38 was falling from limp fingers, and, out of the corner of his eye, the advancing form of Louis Hardeman as he bolted from the Cadillac, sawed-off shotgun swinging by his side for all the world to see.

That was all over in an instant, too. Everything went back to real time. He yelled out at Louis, "Keep that gun outta sight, you dummy. I got him."

Loyal lackey that he was, Hardeman obeyed.

Yancy's attention returned to the cop, who he was ninety-nine percent certain was out of it, but whom he wanted to check more closely. Yancy grabbed the handle and pulled the door open, but immediately had to close it to keep the cop from falling out. This was one cop who wasn't going to make any further trouble.

Louis was there by this time. "What are we waiting for? Dump him and let's get moving."

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"NO! Not here. That'd just get somebody looking for this car right away. Get in the other side and pull him over so I can drive."

Louis did, and behind the cop was a large area of cushion, soppy with blood. Yancy reached into the back seat and got the cop's raincoat. He spread this out over the stain before he got in. In another minute or so they were speeding off down the interstate; the entire process took less than five minutes.

For a long time neither of them said a word, and there was silence. Then, a baleful moan rang out. Hardeman jumped away, reaching for his gun. "The pig's alive. Stop the car, and let's get rid of him."

Yancy took a quick glance over at the wounded man. He could see there was a hole in the left side of the cop's chest, and some kind of bloody froth coming out of his mouth with every breath he took. He wasn't moving and his eyes were closed. Yancy decided he was no immediate threat to them—certainly not enough to justify wasting the time it would take to stop and hide his body along the roadside.

He had better use for this time. He intended to carry out the original plan, and stop another car that nobody could identify with them.

But all of a sudden there was a lull in the traffic on their side of the road. They were in one of those rare gaps that sometimes happen, where there wasn't anybody in close proximity. The best bet, according to Yancy's present lights, was a white van about half a mile ahead of them now. It had just entered the interstate from a feeder road—the road that led, of all places, to Buzzard Guts, the town they might have stopped in to get gas, had they not run out first. Yancy made up his mind. It looked like a delivery van, and that was something nobody would ever expect them to take. "Gimme his hat, Louis."

Hardeman pulled the broad-brimmed hat off the man's head and started to hand it over. But he changed his mind. He couldn't resist trying it on himself first. "Fits me better."

"You can have it when I get through with it. I'm driving, and I need it. You stay down while I pull this guy over."

All the time this had been going on the radio had been silent. Suddenly, as if to add to the drama, a voice erupted from it, which startled the two already scared fugitives. "Ready on your request for I.D., 95."

"95!" Hardeman screamed. "This car's 95. They're talking to us."

"95? —You OK, 95?"

Hardeman grabbed the dangling microphone and keyed it, and straining to attain the bass tone he thought a man the size of the cop would have, he uttered one word—"Yeh."

"That's a good lead, 95. The plates on your stop are for a 1981 Chevrolet —not a 1992 Cadillac. We're checking further. Want a backup?"

"Uh—no, later maybe."

"We'll get back to you then."

"So far, I think we're OK, Crumbbug."

"Hurry, or we won't be. Why dontcha' put the siren and lights on and slow him down?"

"Cause I can't find 'em. I never drove one of these before—I don't know where the switches are." Yancy began fumbling around under the dash, and all

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the while his foot bore down more firmly on the accelerator. The distance was closing rapidly.

"Wal, whaddaya know? Look who's back there behind us, Irene?"

Irene Haas scrunched up over the armrest until she could see out the back through the rearview mirror in the center of the van's windshield. "It's Beau, and he's really moving, too. He must be after somebody. Maybe he's after us."

"Then it's the end of the game, Irene. He won't like it when he finds out what we been doin', and he'll know right away when he sees us together. You'll just have to stay out of sight. Get in the back and hide."

Irene lost no time in crawling between the seats and sliding into a cavity between two stacks of bundled newspapers. She and Corine were identical twins, and they had been pulling a trick that twins have used from time immemorial in order to amuse themselves —they had been carrying on a relationship with a single who didn't suspect there were two of them.

"You all set, Irene?"

"Yeh."

"Good—it looks like he's serious. He's got his candles lit."

As if to punctuate this remark the wail of a siren rang out that instant, and rapidly closed the short remaining distance.

"Oh-oh! He is after us—and it's not Beau—its another cop, in Beau's car. He's motioning me to stop."

"Were you speeding?"

"No. I guess he's got some other reason. Maybe he's a friend of Beau's."

Corine slowed the van and pulled over to the side of the road. As she brought it to a stop the squad car rolled up behind them, parking so close that it was impossible to see it in the mirrors.

So, when a figure dashed around the side and up to Corine's door she did not see him coming in time to do anything but scream. Scream she did, when she saw the skinny, scraggly-haired kid. She screamed again when she saw the sawed-off shotgun in his hand, and again when he reached for the driver's door.

The man had the door open by this time, and had reached inside to grab Corine by her long blonde hair. He pressed the muzzle of the shotgun against her chest, turned, and yelled back at his companion, "you picked a good one this time, Yancy—we can have some entertainment while we travel. C'mon —get up here and let's get moving."

In his excitement he did not hear a noise that he might not have recognized anyway, and certainly after that he heard absolutely nothing. The reason was that the body's auditory center lies near the back of the skull. By then, Hardeman's skull didn't have any.

Corine let go with one more scream before she regained control of herself. She had known, of course, what the noise was. She was not taken completely by surprise. She had known what her sister would do—what she herself would have done in her place.

Nor did her reasoning stop there. She knew something had happened to Beau—that a criminal had overpowered him, and had his car. No—no, that wasn't all. The dead man had at least one companion—he had yelled at someone before Irene fired. That person was no doubt also armed and would certainly

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have heard the shot. He would be piecing things together just like she was.

A shot rang out behind her. A heavy slug crashed through the van's rear doors and thudded into the stack of newspapers behind her seat. Corine had lived around firearms all her life. She could tell by the reports what she was hearing, knew it was a pistol shot and that it had been meant for her. Whoever was still in Beau's car wanted her dead.

But for the protection of the paper he might have made the grade. Certainly, if she hung around and he got out he could get a clear shot at her. On the other hand, opening the distance would put him at a disadvantage—a Winchester had the reach on him. She hesitated not an instant longer, but threw the van in gear and floored the throttle, yelling as she did so to Irene: "Soon as I stop, put one through the engine block."

She was a couple hundred yards down the shoulder when the image in her mirror began to move—Beau's car was giving chase—it was time to use the brakes. She did it without hesitation, knowing that if Irene was a hair too slow, or couldn't make it to the door because of shifting cargo, she might find herself looking down the muzzle of the other man's gun in seconds.

Fortunately it didn't happen that way. Irene had been ready, and had climbed to the top of the stacks. And she didn't bother to open the door—she fired right through the tempered glass despite the mess it would make when it fractured. She was fast enough.

She was fast enough so that not only did the squad car stop, it was out of accurate pistol range of the van, even if the view hadn't been obscured by clouds of billowing steam from the punctured radiator.

After that it didn't matter. Both of them could take their time. Irene used another well placed round to tell the other man how absolutely unsafe it would be for him to try to leave, while Corine used the emergency C.B. channel to summon help.

"Guilty! You want *ME* to plead *GUILTY*—to murder? I didn't kill Crumb-bug—the broad did. What kind of a place is this, Salyer? You're supposed to be on my side—you're supposed to fight for me. I got constitutional rights."

Sean Salyer had once been quite fired up about the constitution, and had regarded its protection as the prime mission of an advocate. The years had mellowed him, and changed his viewpoint to something a shade more practical. He still believed in it, but in moderation, and he was long past the point where he could look on a criminal appointment as anything but an exercise in frustration. "So you do, Mr. Hinson; so you do," he replied.

"Well, it don't look like you're doing anything about 'em."

"What is it you'd like me to do, Mr. Hinson, besides get you off scot free?"

Hinson said nothing—he simply glared.

"Well, what if I did? Then maybe they'd send you back to California to stand trial. I understand you left three bodies there."

Hinson glared back at him. "They don't have a case against me back there."

"Maybe not. Maybe that's why they

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haven't put a hold on you. Maybe they figure Texas'll do a good enough job on you." He paused.

"And maybe it will. The State of Texas certainly can make a case—capital murder of Louis Hardeman—attempted murder of Trooper Tighe—attempted murder of Irene and Corine Haas, not to mention kidnapping, aggravated assault, automobile theft, and a whole mess of other stuff. And even if neither state wanted you the Feds could step in and lock you up for decades."

"I don't want to plead."

"I know you don't, but the way I see it you don't have a whole lot of choice. If you go to trial I think you'll be found guilty, even if the court grants your motion and you get a venue change. The D.A.'s so confident he's already told me he wouldn't oppose that; in fact, he said he hopes we get a nice, big, wicked county like Harris County, so we can all enjoy some of that Houston night life."

"Who cares what a hayseed D.A. thinks."

"So, Pedeza's a hick—so am I, but neither one of us is in jail, and you are. And it's not my arm, or his, that the needle goes in if you go down on capital murder."

"Yeh—well, if their case is so good, why is he trying to make a deal?"

"How do you know it's not me?"

Hinson shot Salyer a suspicious look. "Maybe I ought to be getting another lawyer."

"Suit yourself. I've got other things to do that pay a whole lot better." Salyer began gathering things off the visiting room table and stuffing them into his case.

Hinson stopped him just as he was rising. "Uh, wait a minute—wait! I asked you a question—I want an answer." His tone was a good deal more subdued than it had been just an instant before.

Salyer yielded. He sat back down, though he continued to dangle his case by the handle. "Maybe I caught Les in a weak moment. Maybe he just wants to be one hundred percent sure you do go up for a good long time. Maybe he figures too many things can go wrong when you shoot for the death penalty. Maybe he figures I'm just too tough for him, in spite of what you think." Salyer smiled weakly, and started to rise again.

"Uh—wait a minute; I said I wanted an answer. You haven't answered me yet."

Salyer did not sit, but he did stay and he did answer. "You know that the Trooper's been paralyzed from the neck down since you shot him, don't you?"

"Now wait a minute—I never said I shot—"

". . . I know, it was Hardeman, not you—whatever; since he was shot, Beau hasn't even been able to feed himself."

"What's that got to do with it?"

"The rumor is, Trooper Tighe is probably going to sue you."

"WHAT?" Hinson's jaw cracked into a broad grin, then gaped even wider. Peals of laughter erupted into the tiny room, so boisterously that the jailer knocked briefly and asked if Salyer was all right.

"That's rich, Salyer—Tighe's gonna sue me—and I pay off a dollar a month out of my commissary fund for the rest of my life? Is that it?" He roared with

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laughter. "And you, Salyer—you gonna let him do that?"

"Why not, Mr. Hinson? As you just indicated, you're essentially judgment proof. What have you got to lose? Besides, what would you pay *me* with? You only get me free in criminal cases."

"You know Salyer, I don't know quite what to make of you."

"Good."

"No, seriously. Maybe I gotcha all wrong. I know you don't like me, but I've got a feeling you don't want me executed, either."

Salyer stood silently, gazing at his client.

"Tell me again what I get if I plead."

Salyer sat down, and carefully explained. "You plead to capital murder, not just murder, but Les will withdraw his demand for the death penalty and instead will recommend life."

"That's it?"

"That's it."

"What about all that other stuff you were talking about?"

"Gone."

"Can I appeal?"

"Not to a state court—but if you can get into the federal system—"

". . . I might still beat it?"

"Stranger things have happened."

"That's without possibility of parole, I guess?"

"Les didn't make that a condition, so I assume the state wouldn't object if you were otherwise eligible."

"And you think this is a good deal—that I should take it?"

"It's not up to me. My job is done when you understand all the consequences and give me your decision."

"If I say 'no' then it's 'no,' and I get a trial?"

"Whatever you like, Mr. Hinson—with me or without me." He paused again, and waited patiently for Hinson to respond. When Hinson didn't he rose again, turning toward the door. "Is that all you wanted?" he asked finally.

"I'll take the deal," Hinson replied gravely.

"How come I'm still here in the county jail, Salyer? Why haven't they moved me on to the joint?"

"Is that why you sent for me?"

"Uh—yeh; I mean, I'm practically all alone here. There's no other prisoners, except drunks, on the weekends. I'm bored."

"Well, first of all, they want to be sure they have room for you. Then, even though you haven't got any grounds to appeal your plea, the Court of Appeals would still have to act on your request if you filed notice of one anyway. They usually keep prisoners here until the appeal period is up. That's for thirty days, so you ought to be going soon."

"Yeh."

"OK—Look, Mr. Hinson, as I told you, my job is already done. I'm on my own time now. I only dropped in as a favor, but I do have another prisoner to see now."

"Uh—Salyer—while you're here, there is something else—this." He drew a sheaf of folded, wrinkled papers from his back pocket and held them out to Salyer. When Salyer didn't reach for them Hinson drew them back. "Well, aren't you gonna look at these?"

"I've heard the news, naturally, Mr.

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Hinson. I know that's a complaint and citation. Tighe sued, didn't he?"

"Yes. And your hick D.A. is his lawyer. I thought he wasn't supposed to do stuff like that."

"It depends on the county. Some of the small ones permit it. This is one that does." Salyer reached for the door.

"Wait a minute—I'm serious, what does all this stuff mean? What does 'execution against the body of the defendant' mean? What about double jeopardy?"

Salyer chuckled. "Oh, I see —execution; no, they don't want to kill you, Hinson. What it means is that in certain civil cases, where certain extra elements are prayed and proven—what we call willful and malicious conduct—a plaintiff gets a special judgment. This judgment gives him the right to have the defendant arrested and thrown in jail until he pays the judgment off. It also bars discharge of the obligation through bankruptcy." He grinned. "I don't imagine you'd want that to happen to you, would you, Mr. Hinson. Still, I think you ought to get yourself a lawyer, and that's the only comment I'm prepared to make on the case. Now, I really have to go." He rapped lightly on the door and stepped around the jailer who opened it.

It promised to be a big day for the town of Buzzard Guts, maybe the biggest one they'd ever had. Certainly, never before had national TV ever even suspected it existed, and they were here today—all of them. So was the Governor, and both Senators, as well as a horde of other dignitaries, real or pretended.

Beyond the town's main street, on which there was now barely room to stand, acres and acres of parked cars and pick-up trucks littered nearby fields, but thanks to the efforts of the D.P.S. Troopers, who sealed off the access road in response to the pleas of the town marshal and the resident deputy sheriff, Buzzard Guts was spared the ignominy of being stomped flat beneath the feet of gawking rubber-neckers.

The turmoil extended even to the interstate, almost three miles from downtown Buzzard Guts. Here, no one except locals and people with passes were allowed to turn off, though many did try, and consequently there was a substantial traffic jam.

The car bearing Beau Tighe and Les Pedeza, though it was, of course, escorted, was caught in this, and the caravan had to wait until the troopers had cleared the way before it could go on. And even then there was a delay while those on guard approached to shake Beau's hand through the open window and to wish him well.

As soon as they pulled away and the car began to pass slowly down the access road Les gave Beau a gentle poke in the ribs and grinned. "See what you did to your home town, Boy?"

"Wish it was over, Les. I feel weird enough as it is. I don't mind telling you, there's been lots of times since that I was sorry I done this."

"You'd rather have stayed paralyzed?"

"No—no, that's not it. It's just that I liked my own body a whole lot better, and I don't see why the doctors couldn't have just gone ahead and fixed that in-

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stead of spending millions to do what they did."

"Proctor said that's still beyond them, Beau, though like you, I have trouble understanding how that can be if they can do this." He tapped Beau lightly on the shoulder. "It's always rough on the guinea pig, I guess, but there had to be one, and this just had to happen sooner or later, Beau. It was just dumb luck it turned out to be you. It'll pass, everything does—like they used to televise satellite launchings. How long has it been since you watched one of those?"

"A long time, Les." He said it with a sigh and gazed ahead, where the image of the crowd was growing.

"Look at it this way, Beau—maybe what happened to you will save some other guy from having to go through the same thing. It's likely to, you know. Have you ever thought about it that way?"

"Some, Les. Mostly, I guess I just wished those crazies would have stayed out on the coast where they belonged."

"And if they had? Beau, they would have gone on the way they were doing, because they were in a society that tolerated that sort of thing. Getting them out of that into one that didn't, and wouldn't, stopped the killing they were doing. Anyplace else, would Corine have had that rifle? No, she'd have left it home if she had one at all, because you would have arrested her for carrying it. If it wasn't a constitutional right in this state and if our forefathers hadn't made that constitution so hard to amend we'd have been in the same shape as most other states are, and all three of you would be dead."

"I got careless, Les—"

". . . Maybe—OK, so maybe you were, but you would still have had to shoot it out with two of them. The odds were against you and they knew it. The criminal always figures the odds, Beau, and he strikes only when he thinks they favor him. Odds are the only thing that mean anything to people like that, and this may be the most important lesson in all this—the odds have changed."

"I guess they have, Les." *I guess they have*, he repeated silently for emphasis. He and Les had talked about that once before, during the trial of the civil case, and Les had demonstrated how true it was.

Hinson had been uninterested then, and stayed that way until he saw that the consequences were going to be a little different this time. Wiser, he did get counsel then, after a fashion, but by then it was too late—he was in a position where he had to pay, probably for the first time in his life.

And that had given Les provocation for many a chuckle. Les enjoyed playing the part of country hick. He preferred to have his opponents underestimate him. He had the role down pat.

Hinson was totally fooled. He never stopped to consider what the words on the complaint might mean in the end. He neither knew nor cared that he was in the Bible Belt, though he certainly should have. The jury did. The jury took such concepts very seriously. They listened stoically to days of testimony from the occurrence witnesses—a tactic that Les had counted on both for shock value and to build a perfect record for the appellate courts he knew would later review the proceeding.

And then Les brought in Proctor, and

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Proctor told those same jurors that if they chose the means were at hand to obey that ancient injunction; to right the wrong, literally, in kind, an eye for an eye, and a tooth for a tooth—reality had caught up with these ideals—modern medicine could now do this.

It was a small step for Les then to point out that money alone would not make Beau a whole man again even if the defendant could pay; that in the past money had been the measure of damages, because no other measure was possible; that now this was changed.

He asked the jury to compensate his client with the actual body of the man who maimed him and the jury did so.

Of course, this was not the end. Hinson screamed. Hinson was heard by the sensation-hungry media, which attracted publicity-conscious civil rights activists possessing vast funds, which attracted people anxious to lay hands on same. It was Hinson who now sought vindication. He appealed, choosing from among these contestants a Los Angeles firm, because, he said, he didn't trust that treacherous bunch in Texas.

Les smiled when he heard this. It suited him just fine. He knew his case, he knew his law, he knew his court, and sure enough the appellate court, in a brilliant opinion by Justice Countiss, went on to affirm.

Hinson had one more shot: a guaranteed shot owing to the novelty of the case—certiorari to the U.S. Supreme Court—and lost there too, because the only issue he could raise was due process, and he had certainly, the court said, gotten that. "There is no doubt," the court remarked, "that the state's forbearance to inflict the death penalty was an act of clemency and served to preserve the appellant's life."

By then, of course, Hinson was not in the penitentiary any more. He was too big for that, too important. Hinson was a celebrity.

But he was a celebrity in the same sense that the turkey waiting to be made into Christmas dinner is a celebrity, and he knew it, so he was making threats again—threats to do the only thing that might possibly defeat Beau's claim. So, until the actual operation had taken place he had been restrained against possible self destruction. After that, perhaps for the first time in his adult life, Hinson did not present a threat to himself or anybody else.

There was a roar of applause. All of a sudden, Beau was hurled back to reality again. The car was entering the area cleared by his colleagues, and was nearly to the reviewing stand. He could gaze into the crowd and see the smiling, beaming faces of his friends and neighbors, who waited to greet him. He could see that they had been deliberately positioned to give the best advantage to the TV cameras with which the crowd was studded. That part he didn't much like. He wasn't all that proud of his current physique, though he hoped this wouldn't change his relationship with the Haas twins, who now stood beaming at him from the front of the crowd.

Someone opened the car door. It was a D.P.S. Captain. He assisted Beau out of the car and escorted him to the podium, where the governor waited, smiling into the cameras.

Some syrupy scenes followed. Banal words were uttered, and then occurred the event that everyone had really come

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to see. Everything that had come before, thought Beau, would be wasted without this. He joined the crowd to wait and watch as another limousine approached the bandstand.

When it stopped the procedure was repeated, although this time the escort was not a captain and the guest did not walk, but was pushed up a ramp in his wheelchair. The guest was Hinson.

Another brief ceremony followed. When it was over the trooper pushed Hinson's chair down the ramp again, and the car drove away.

Beau, together with the governor, Les, Proctor, and a couple of the governor's aides piled into another car that would take them to Pedeza's house for lunch.

"You know, Governor," Les said as they drove away, "there are people who will criticize what we just did—who will say that the whole episode was barbaric."

The governor paused a moment before he answered. He conceived himself as different, a throwback to conservatism, and a change from the string of liberal governors the state had recently endured. He made it clear he wasn't buying that. "I can take the heat," he replied. "It's the people I have to answer to, and the people are with me; they approve. They can see the justice in it. Better yet, they can see the sense in it.

"Best of all, it's something that in this case, at least, impressed the criminal too, and maybe with a little luck some of these people will look at Hinson and see themselves if they don't straighten up. It's one thing to talk about so many years in the penitentiary, but most of these people don't let that scare them, and as I'm sure you've noticed, they can adapt rather well to it. Some of them even find a real home there.

"You know why I *really* pardoned Hinson, and why I made such a big deal out of it?"

"I've got my theories about that, Governor."

"Yes, well, I had mine too—that's why I decided to do it that way. I asked myself, 'what is more memorable —reading about a crook getting life to rot in the joint, or the sight of Hinson, in that chair with his head on another man's body, a body he wrecked?' I didn't have any trouble with the answer; I knew, and I knew I never wanted that to happen to me.

"Science has done something no amount of preaching would ever have accomplished—it's changed public mores. I doubt if we'll see this happening in too many criminal cases but I'll tell you one thing—I'll be a whole lot more careful driving my car now that I have to worry about somebody I hurt who might later try to take my body away from me. Yes, sir, I will."

Beau smiled. He and Proctor and Les had discussed that too, on occasion, but they'd taken the trouble to pencil it out. And as it turned out, except for special cases like his own, where there was a point to be proven, the money and manpower requirements for such operations was just too enormous to ever make them very common. Not every operation could be financed by public subscription as his own had.

Too bad, Beau thought, staring down at scrawny legs—*an eye for an eye sounds good—if only all eyes were*

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equal. His thoughts drifted back to the Haas twins—the acid test. *I'll just have to do the best I can with it*, he thought.

Then, another thought struck him—a horrible thought he'd never considered before: Hinson's body, Hinson's genes. Beau broke out in a cold sweat. He turned toward the others. "Doc," he said, in a quivering voice, "there's one more thing we have to talk about." ■

ON GAMING

(continued from page 159)

Each team then enters the playing area and goes to their base, a long column with a light-sensitive target. When the game begins (with a hearty "Greetings, Photon Warriors . . .") each team tries to hit the opponents' base and zap as many members of the other team as possible. An LED light on your phaser lets you know if you're really on a target. If you hit someone, their phaser goes dead for five seconds. You can only score three consecutive hits on the same opponent. After that, you must move onto another target before you can score on that player again.

There are also observation areas where visitors can watch, or even operate some coin-op phasers to shoot players. These hits do not count against any player's score. *Photon* also supplies rules, such as no running or climbing, and a tip sheet that helps newcomers get started. There also were several Photon experts in attendance who went in with us to make sure we knew how to play.

Photon proved to be an entertaining evening. The first game was frantic and confusing, but also exciting as I prowled around for red team members. It's quite a startling experience to turn around and find that some one has their phaser aimed at your blinking helmet. A fog machine and appropriately martial music (Wagner, on the night in question) created a nice atmosphere. Best of all, we felt no guilt running around like kids playing guns. Players leave the battleground, laughing and sweating, to examine their scores on the video displays.

There's only one difficulty we had at *Photon*. They make a big deal about distinguishing the gun sounds you hear: a hit, a miss, and a hit on one's own team. The electronic bleeps are much too similar. And I can't imagine why they weren't made more distinct.

The wave of the future? I don't think so. The cartoon show and the 4'6" height requirement will keep a steady supply of kids eager to enter Planet Photon. But repeat play doesn't seem intriguing. It may be the type of thing you'd do once in a while, especially after an annoying day at the office.

On the other hand, with holograms planned for the future, *Photon* may just evolve into a genuine science fiction role-playing game. And that would be something to see. ■

●If scientists are worthy of the name, they are indeed about God's path.

Samuel Butler

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the reference library

By Tom Easton

The Dream Palace, Brynne Stephens, Baen, $2.95, 288 pp.
Moonbird, Grania Davis, Doubleday, $12.95, 181 pp.
The Drastic Dragon of Draco, Texas, Elizabeth Scarborough, Bantam, $3.50, 256 pp.
Eros at Nadir, Mike Resnick, NAL, $?, ? pp.
Harlot's Ruse, Esther M. Friesner, Questar (Popular Library/Warner), $3.50, 296 pp.
The Black Grail, Damien Broderick, Avon, $?, ? pp.
Triad, Sheila Finch, Bantam, $3.50, 240 pp.
The Book of the Stars, Ian Watson, David & Charles (North Pomfret, VT 05053), $18.95, 208 pp.
Beyond Armageddon, Walter M. Miller, Jr., and Martin H. Greenberg, eds., Donald I. Fine, Inc., $18.95, 387 pp.
Children of the Light, Susan B. Weston, St. Martin's, $16.95, 262 pp.
Mythical Beasties, Isaac Asimov, Martin H. Greenberg, and Charles G. Waugh, Signet (NAL), $3.50, 352 pp.

Let us begin this month with three curious fantasies. The first is Brynne Stephens's ***The Dream Palace***, which is curious for at least two reasons. First, it actively involves the reader: The tale begins as two friends at the tail of youth decide to leave their village, where they are too plain, too ordinary, perhaps too gentle, to attract the mates for which they yearn, and embark on a quest for true love. A traveling peddler gives them spells and charms to help and tells them of the Dream Palace, whose ensorcelled inhabitants sleep away the years. And they leave, hiking across a landscape of perils familiar in fantasy, but prosaically muted. Everything is the everyday, and our heroes, Watkin and Kym, are ordinary people who must make ordinary decisions to fight or flee, help or hinder, cooperate or obstruct. They meet a lonely queen in a mazelike castle, a witch with dreams of domination, a band of role-playing elves and

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trolls who deliberately remind one of SF conventions, a wizard with a family, and finally the castle of dreams. As each decision point arises, Stephens asks us, the readers, to make it and directs us to turn to an appropriate page; she spells out consequences in an appendix, too, and there we see the many ways the tale can end in midstream, with death, surrender, or a love that is not quite true.

Dream Palace is thus one with all those "interactive" books—mostly tripe—that have been on the kiddy market for the last few years. It remains a computer game on paper, and Stephens has indeed written computer games, but it is not quite for kids. It is bigger and more complicated, though it retains the innocent, unreflective tone typical of the subgenre (when a tale has no set plot, there is little use for foreshadowing, philosophizing, suspense, and other tricks that knit a plot into more of a whole).

The book's other curious feature is that it is a prize book. The tale is pleasant, if unexceptional, and there is a useful message on the value of pursuing dreams and following through on one's decisions. The prize, however, is more concrete: The publisher has posted a $500 reward for whoever best answers the mystery of the Dream Palace (Who put its inhabitants to sleep? How? Why? When? And how can the spell be broken?). The answers *are* possible, but they are not obvious.

Grania Davis's **Moonbird** is our second curiosity. It too is a fantasy with a strong flavor of innocence, and it resembles the Stephens book as well in its emphasis on the value of making life-affirming choices. It is curious because it moves far away from the usual European base for fantasy to the South Seas, to an island near Bali, and it gains considerable charm thereby.

Davis gives us the boy Madai, the dreamy son of a village fisherman. As a child, he finds an amulet in the forest, a moonstone carved into the shape of the eagle-god Garuda. He holds it to the sunlight, and the god himself appears, inviting the boy to climb upon his back and to fly wherever he wishes. Madai accepts, leaving his body entranced in the jungle clearing but still able to return with a mountain orchid, a seashell, or a basket of lobsters from the bottom of the sea. And when his brother is bitten by a snake, he learns that Garuda can even bear him into a wound to clean out poison and save a life. He becomes a healer of renown.

Yet the island culture has its devil too, the witch Rangda, who causes all misery and despair, and she soon appears to Madai, inviting him to seek satisfaction in the power to cause death. He is tempted when Ram, a rich widower, courts the girl he loves, and Ram falls quickly ill with a virulent cancer. But he repents, and with Garuda he then does battle with the cancer. He succeeds, but he is a long time recovering from the wounds he suffers in the fight.

Madai is tempted again when the outside world, in the person of a wealthy, powerful woman with cancer, arrives. He uses the powers of Rangda to strike down the young man who causes the death of his sister, he loses his contact with Garuda, and the dilemma—life or death, power or love—becomes vividly acute.

I will tell you no more of the tale. Davis brings the Balinese setting and its mythological background vividly to life in the service of her fantasy, and her tale is well worth the attention of all fantasy fans. Better yet, she may show other fantasy authors how effective nonstandard backgrounds can be in fantasy. On the other hand, a few others have

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gone out of Europe before, and they too have enriched the field of fantasy immensely, but none of them have been widely imitated. Perhaps the readers and editors are too enamored of knights in armor to fall in love with monkey and eagle gods, or Wellman's Appalachian bogies, or . . .

Has Elizabeth Scarborough been reading too many dime novels to while away the long Alaskan winters? This month's third fantasy is **The Drastic Dragon of Draco, Texas**, and it is a jape. Scarborough's heroine is Valentine Lovelace, the daughter of a drunken newspaper publisher in San Francisco. Drunk herself on dime novels, she decides to strike out for independence and bestsellerdom and embarks on a research expedition via muletrain into the wilds of Texas. She is being carried off by Indians when a dragon soars over the mountain, fries a horse, and scares the Indians out of their gourds. Thinking her bad medicine, they promptly sell her to Drake, a villain with a con man's graces, a comanchero who runs a "trading post" and ranch in a hidden valley. It is one of his disgruntled women who has summoned the winged serpent of her ancestors, Kukulcan, for aid, and she has been answered.

Kukulcan soon makes his presence obvious. He devours the livestock, chases off the Indians, dries up the river, and terrorizes the ranch. Our heroine senses his thoughts in her dreams—he is an alien come to civilize us long ages ago!—and she soon becomes something of an intermediary. But that is not really the point. Scarborough has thrown into the pot a rainmaker reeking of snake-oil, complete with sidekick Chief Rain-in-the-Face; an indiscriminately villainous scalp-hunter; a cavalry rescue; and all the trimmings. She has even made her dragon something of a chump, egotistical and greedy, but just a tad simple-minded. Her goal is broad humor, leavened with a touch of feminism (only the women really know how to do things *right*) and, speaking broadly, she achieves it.

My cavil is that she relies a little too much on slapstick and too little on wit. Granted, she has taken much the same approach before, but I seem to recall that wit has played a larger role in her past books.

Mike Resnick's grand conceit, that whorehouse in the sky, has now fallen from grace. The Velvet Comet is abandoned, derelict, unpeopled, doomed to be turned into a housing for plebeian business offices. Yet there is still a tale or two left in the old dame.

In **Eros at Nadir**, Resnick displays the destiny of all glamorous settings —they become stages for plays, movies, or Rounds (holographic movies). First, however, comes the screenwriter, who must soak in the dimmed ambience while he tries to come up with a winning plot, not too downbeat, and a libretto to match. Such a character is bottle-loving, debt-ridden Nate Page, would-be litterateur who is famous only for his self-compromising mass-market Rounds (one dealt with Billy-Buck Dancer). Prodded by a reflective Cupid, the Comet's computer, grown almost(?) sentient, he toys with the idea of telling the true, bleak story of the Comet's whores. He even assembles an opening scene or two, but the result so enrages the wealthy producer, and so threatens Nate's job and future employment, that he convinces himself that there is no way he can write anything else but froth. And in the end he produces marvelous froth indeed.

Resnick is talking partly about the

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process of writing, the endless round of notion and sketch and draft and chuck it for a new notion, and he does it well. After all, he has himself written some 20 million words of fiction.

He is also talking about the *reasons* for writing, and he says that money is not enough, no matter how much the end result appeals to the masses. There must be something more, something the writer wishes to say to his or her audience, or the job is only an exercise in futility. Nate Page, says Resnick, is as much a prostitute as any past employee of the Comet, for he has abandoned his sense of literature as a bridge between writer and audience. He has accepted the view that literature should be no more than gratification of the audience's fantasies.

Against this, Resnick sets Cupid. The computer is more honest, despite its long link to whoredom. Observing, it has learned, and it wants to say something to the human world. In its "soul," Cupid is more a writer than Nate. Alas, Cupid lacks Nate's skills. No one will ever read or watch its tale—unless Resnick decides to write a fifth novel for the series. I can see it now: In the dim light of a darkened office, a screen flickers; a printer clacks; and Cupid's novel comes forth.

I wonder. Is Resnick also talking about his own reasons, his own writing? Is he, perhaps, saying that he has fought Nate Page's fight and won it, choosing message over moolah? Or is he saying that he fights it still? Is he being told by editors or readers to leave the message out, to take the money and run? If so, then I hope he continues as he has been, messages and all. I enjoy them, and I note with satisfaction that he seems much in demand.

Esther Friesner's **Harlot's Ruse** is a distinctly lesser tale of whoredom. Heroine Megan is in turn captured by love, poverty, a brothel, love, pirates, a dragon, a knight, a demon, a sorceress, a god, and a king, before finally locking up her first love for good and all. She wins out each time with her beauty, her amatory skills, and her luck, and while the tale is by turns erotically charming and frenetically active, in toto it is a tiresome read with little to recommend it. The reader wears out long before Megan.

I have read and enjoyed one or two of Damien Broderick's past novels, but I missed his first, *Sorcerer's World*. That may be just as well, for now he has rewritten the book, doubling its length (according to the publisher), and retitled it **The Black Grail**.

The two titles suggest that Broderick offers us a fantasy, and he does, in a way. There are barbarians and swords and what seems like magic, but it is all tied to our technological future. Hero Xaraf is born centuries after nuclear holocaust to the nomadic Firebridge clan. As a child, he is taught by the outland shaman Darkbloom, whom his father had castrated. Taught the Way of the Open Hand, nonviolence, given dreams of strange worlds and his heart's desire, he vows never to kill a human being, though the vow goes against all the ways of his people. And then, to please a father disturbed by reports of a ravening sorcerer approaching their land, he goes out to fight bandits. He kills after all, is lost in a blizzard, and tumbles into a bright conduit to a future a million years away.

There he meets the immortal Powers who rule Earth and strive to rescue the sun from its fading, caused when prior ages drained its energies for interstellar travel. He is stripped of memory and

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sent forth to learn the things he will need to aid the Powers in their task. He sees wonders, saves the girl of his dreams from a fate worse than death, and does indeed gain the tools he will need. And then he learns both the name of his father's enemy and the nature of futility.

The tale is a quiet one, lacking the raucousness of standard adventure fare, but it is also satisfying. Broderick has knitted a number of threads into a nicely circular whole. However, the ending, while dramatically suitable, may not suit the modern reader. I suspect it may not suit Broderick, either, for it has the feel of the first installment in a trilogy. If so, the whole trilogy promises to be one of the most scopeful, sweeping things in recent SF history. In fact, *Grail* by itself may qualify for the pennant, covering as it does some five billion years, explaining God and the Devil, and throwing in intelligent dinosaurs to boot.

Sheila Finch's **Triad** is somewhat more conventional in form than her first novel, *Infinity's Web*. It may, however, be somewhat more interesting as well, for Finch is concerned with the ramifications, the consequences, of feminist ideology. She demonstrated her thoughtful approach before, and here she does it again.

Like many women writers, Finch begins with an essentially implausible premise, that men have lost their spirit and turned the world over to women. However, she justifies it very reasonably. Not far in our future, the drug companies bring to market a compound that kills Y-bearing, but not X-bearing, sperm. In a male supremacist world, it would have gotten nowhere, for men want sons. But in a world marked by more-or-less equality of the sexes, the women have the say, and they want daughters. So they have them. Males, in consequence, become less numerous, and women take power. Being human, they get snotty about their new dominance. And when they develop practical cloning, some decide men are unnecessary, undesirable, nasty critters.

At the same time, the world has come to be run by a master computer, CenCom. Interstellar travel has brought humanity under the sway of the all-powerful Sagittans, who regulate contact and commerce. And a freighter, thrown off course by a mysterious dustcloud, has found the strange world of Ithaca 3-15d.

The freighter returns, sent by CenCom to gather trade goods and learn more of the natives, who may be sentient. The ship's crew is all female, of course, except for one lone male, artist Zion Marit, rescued by CenCom from a mob and thrust into the ship with little notice. His interactions with the crew say something about the essential humanity of even radical feminists—it isn't that he seduces them, but that they act much like male sailors confronted with a female crew-member. His interactions with linguist Gia Kennedy, raised among "primis" who preserve something of the nuclear family and reproduce naturally, give Finch a chance to underline CenCom's remark that it does not think cloning is the best way to preserve the species for the future. His intuitive success with the natives, so much greater than Gia's more technological approach, lets Finch stress that males can share many so-called feminine characteristics, such as intuition, without being any less masculine.

This humane message imbues a context of mystery. Ithaca 3-15d's natives have a multi-level language, but no apparent sense of self or time or death. They are, perhaps, presentient. Yet there is a shattered warship in orbit

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about the planet, another in the jungle, and a ruined city in the forest. The answers, and the search for them, knit the tale together, and in the end they resolve into a glimpse of a remarkably sane interstellar civilization (it may owe something—though not the sanity—to Dave Brin), and of hope for Earth.

The book's defect—isn't there always one?—is that it tends to plod. Far too much of the action is verbal. But that may be inevitable. According to the stereotypes that concern Finch, one major difference between men and women is that between action and talk: the men go bowling, or hunting, while the women have a hen-party.

I did not review Ian Watson's *The Book of the River* when it came out awhile ago, first from Gollancz and then from David & Charles in Vermont. The reason was that, though it was an excellently imagined book with a very effective story of striving and strife on a distant colony world, with the colony split by a river inhabited by a gigantic worm that let only women sail the waters more than once, it had just been serialized in another SF magazine and I felt you didn't need my comments to know how good it was. Now we have the sequel, **The Book of the Stars**, in which heroine Yaleen is murdered by her arch-enemy from the first book, Doctor Edrick, and travels up the psylink to an Earth ruled by a computer that loves roses, suppresses independence, and has ambitions to light up the universe by snuffing all human life at once in just a few more decades.

Watson's imagination is more than a little far-fetched here, but he tells the tale vigorously and convincingly, even when Yaleen is reborn, fully conscious, as her own kid sister, and must patiently await her own murder before she can speak up, become the basis of a new religion, and hope to make the cosmic snuff impossible. I found *The Book of the Stars* a satisfying sequel to that of the river, and I look forward to the next, *The Book of Being*.

Beyond Armageddon, edited fittingly by Walter M. Miller, (of *Canticle for Leibowitz* fame) and indefatigably by Martin H. Greenberg is an excellent assembly of "Twenty-One Sermons to the Dead." The theme is life—its continuance, transmogrification, and even absence—after nuclear war, and Miller's voice, as it shows in his poetic "Alibi," the introduction, and the headnotes, is one of pain and outrage: "There isn't any Rapture afterward. . . . Anybody but a comedian who can talk about the threat of human extinction without raising a little hell must be sick. . . . *O Mother Chaos!* Save us from the outcome of our own mad Reason!"

The stories are excellent. There are Lucius Shepard's "Salvador," Spinrad's "The Big Flash," Ward Moore's "Lot," Ballard's "Terminal Beach," Poul Anderson's "Tomorrow's Children" (which hinted, nearly 40 years ago, at the possibility of nuclear winter), Edgar Pangborn's "A Master of Babylon" and Stephen Vincent Benet's "By the Waters of Babylon," Bradbury's "There Will Come Soft Rains" and "To the Chicago Abyss," Zelazny's "Lucifer," Swanwick's particularly despairing "The Feast of St. Janis," Ellison's "A Boy and His Dog," and more. You will find many that have stuck in your mind for years, just as the Moore and the Ellison and the first Bradbury and the Spinrad have stuck in mine.

This anthology is as apt a crystallization of a main subgenre of SF as you can ever hope to find. Is there thus a

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danger that it may discourage some writers from tackling the theme of Armageddon and its aftermath in the future? I hope not, for we will need fresh voices as long as our leaders believe that the best way to deter annihilation is to enlarge, again and again and again, their capability to destroy us all. I *had* hoped that the discovery of the nuclear winter phenomenon would convince the generals that nuclear war was a genuine no-win situation—no matter who fires the first shot, no matter whether some noble enemy refrains from vengeance, we all die. But they are saying—as usual—that the theory is only theory, which can be proven only by experience, and thus it is a matter of opinion, and in any case it needs more study.

It is a tragic, cosmic joke that our leaders, politicians and generals alike, are all true he-men. It is impossible to scare them into wisdom.

Susan B. Weston takes a rather more hopeful view of the joke. In **Children of the Light**, contemporary teen Jeremy Towers goes for a canoe ride on a filthy Chicago-suburb river. He stops for lunch, recklessly eats a handful of wild mushrooms, and paddles on into a fogbank. When the fog lifts, the river is clean, the suburban landscape lies in ruins, and the people are a single handful of hard-scrabble subsistence farmers whose mythology refers to a long-gone "Time of Light." Their culture is marked by cooperation, tolerance, and mutual acceptance, even of the disfigured and retarded, even of bizarre, confused, bewildered Jeremy.

Jeremy manages to fit in eventually. He learns that the few men he meets are sterile and that the women, who dominate the small community, are inseminated by a visiting "Federal man," sole representative of the remnants of national government; he is a very literal father figure. In due time, Jeremy begins to grope his way back to the technology of water pumps and hot showers, of electricity and irrigation, and in the process he inspires them all. When the Federal man arrives ill with some plague and dies, taking two members of the community with him even as he announces the withdrawal of the government hand from Chicagoland, Jeremy becomes the leader and seeks out one of the other remnant communities the dead man had overseen and fertilized. His expedition to the wilds of Michigan turns up a single woman and her son, all that are left of a belligerent, macho, male-dominated culture that caricatures our own. Empathy, sympathy, and acceptance then convert them to the more peaceful lifestyle of Jeremy's group, and Weston, an antiwar activist for whom her novel seemed "a parable of our time, and of our responsibility to the future," gives us what seems an ultimate repudiation of present attitudes.

The repudiation is total. She even, despite Jeremy's own consonance with peace, despite his fertility and his suitability for fathering a new age, removes him from the scene. And here, to my mind, lies the book's greatest single defect. At the very end, Weston leaves her reader uncertain of everything. Was the story a hallucination brought on by those mushrooms? Or did the mushrooms somehow, really, cast Jeremy into time?

Asimov, Greenberg, and Waugh have anthologized nearly every story ever published in the realms of SF and fantasy. Or so it seems. But their task is worthy. They rescue from oblivion, they replace moldering pulps, they package attractively, they impose unity

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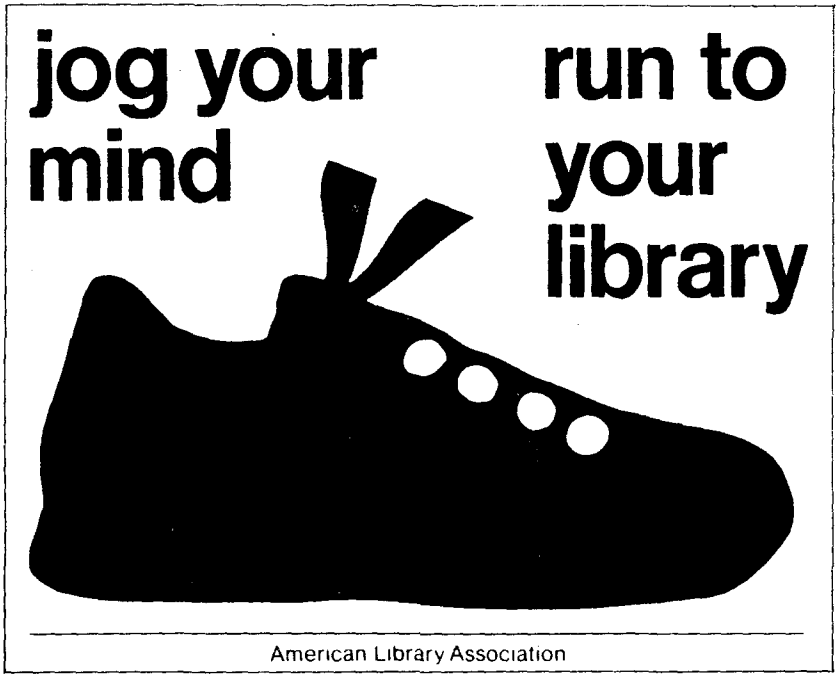
with the themes of their books, and they adorn with the Master's comments.

For Signet, they have been assembling books that center each on some theme of fantasy—giants, witches, wizards, and so on. The latest is **Mythical Beasties**, and it is *not* as cute an anthology as you might think. The centaur is Edward Hoch's "Centaur Fielder for the Yankees," guaranteed to evoke at least a smile. The dragon appears in George R. R. Martin's "The Ice Dragon," a warm tale of maturation and thawing, and Andrew Lang's "Prince Prigio," which epitomizes the didactic fairy tale. Tanith Lee gives us "The Gorgon" who is not quite what she seems. Frank R. Stockton tells of "The Griffin and the Minor Canon," while the kraken appears as Jack Vance's "The Kragen." Hans Christian Andersen checks in with "The Little Mermaid." The minotaur appears in Mildren Clingerman's "Letters from Laura," a petulant time-traveler. F. A. Javor's "The Triumph of Pegasus" discusses the limits of genetic engineering. Robert F. Young's "The Pyramid Project" gives us an alien sphinx with ulterior motives. The late Theodore Sturgeon brings the fine "The Silken Swift," surely among his best.

And finally, there is my own "Mood Wendigo" from these pages. I *don't* believe the editors included it just to be sure I would review the book. The story interprets a mythical beasty as surely as do the Young or Javor tales, and I enjoyed it as much when I reread it. I hope you will too. ■



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brass tacks

Dear Mr. Schmidt,

This is in reply to the letter from James A. Nollet, who suggested that Contact Optimism—as well as an acceptance of evolutionary theory—almost require a suspension of belief in God. Could it be (he asks) that the Contact Optimists are driven to their optimism by a need to avoid belief in God?

The answer is no, sorry—at least in a good many cases. I happen to be a Catholic, and a pretty conservative one at that: I have friends who are also religious believers and we, too, will continue to hope that there are other intelligent beings in the universe, unless or until it is proven otherwise. (As for evolution, as I see it, this *is* God's method of creation, and it's no wonder that it should have come as a complete surprise to human beings.)

Very well, where does it come from —this intense longing to find other living worlds, other intelligences, and to see human beings going out, actually settling in space and on other planets? What follows is my theory.

One can find occasional speculations about space travel for several centuries back, but modern magazine science fiction really got under way in the twenties and thirties, about a generation after the close of the Age of Exploration. Serious rocket experimentation was already under way, and the space program started about a generation after that. Is this longing, then, just a psychological reaction to the ending of the frontiers on Earth? A kind of temporary claustrophobia that will wane in a few generations, as our descendants grow accustomed to living in a settled world? I sincerely hope I'm wrong. It would mean we haven't much time to get established out there before so many people lose interest that it can't be done; and frankly, it worries me.

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On the other hand, SETI does remind me far too much of the cargo cults of the South Pacific islanders. An essentially passive program, hoping some Superior Intelligence will contact us and shower us with new ideas and answers for our problems. I would far rather see the money spent developing our own space-going capacities.

MARGARET HOWES

Dear Dr. Schmidt,

In the wake of the past week's *Challenger* disaster, we would like to express our firm support of the man in space program and particularly the shuttle program, and we suggest a new shuttle be built.

To make the process of building a new shuttle less costly, to create a living memorial to the *Challenger* Seven and to allow all Americans to directly participate in the space program, we suggest that a memorial fund be established for public contribution for the construction of a new shuttle. This idea came from a statement made by an eight or nine year old young lady interviewed on NBC news for her reaction to the Challenger disaster. She said that she wanted the space program to continue and that she thought if every child in school would contribute a dollar that we (America) could build another space shuttle.

We were deeply touched by this comment and feel that her wish and that of the *Challenger* Seven's families be allowed to come to life. We know that such a program would not be easy to coordinate and operate, but nothing worthwhile comes easily. We would like to suggest that the memorial fund be established with the following requirements:

a. That the shuttle built from this fund be used for non-military activities only.

b. That one seat on the new shuttle be dedicated to the citizen-in-space program, and that a citizen fill that seat on every flight to honor the first citizen in space participant, Sharon Christa McAuliffe.

c. That for individual contributions (maybe $1000 or more) have a component of the shuttle dedicated in the contributor's name to the *Challenger* Seven (tiles would be the easiest).

d. That the fund be run by a non-profit space interest group with congressional approval and oversight (suggest the National Space Institute).

e. That the fund be established such that both the individual citizen and business may contribute and that this contribution be tax deductible as a charitable contribution.

We can think of no better way than this memorial fund for the American people to express their support of our national space program and to support our government's need to reduce spending.

We have sent our suggestion to our senators and representative (Ohio and Washington, respectively) in congress, reaffirming our support of the man in space program.

We would like you to write your representatives in congress and would like your help in urging others in fandom and supporters of the space program to do the same, reaffirming support in the manned space program and supporting our suggestion.

With your help, we can do as the Star Trek fans did in the 1970s when in response to an enormous letter-writing campaign, President Ford named the first orbiter *Enterprise*.

CPT LESTER K. PRICE

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KARLENE R. PRICE
32nd SUPCOM Box 1816
APO New York 09058–2836
Worms, West Germany

Dear Stan:

Your editorial in the March '86 issue seems prescient: Did you *know* that there would be a news release about hypercharge, the "fifth force," just about when the magazine went on sale?

BEN BOVA

Of course!

Dear Dr. Schmidt,

With regard to John Cramer's fine article, "Children of the Swan" (March 1986), I found his reference to the Moessbauer effect perplexing. I was unable to find any mention of it at the local library. Perhaps Mr. Cramer meant to write Mossbauer effect, which I found to be amply documented. Nowhere, however, was there any hint of mystery about it. Nor was it difficult to understand.

Mr. Cramer cites the Moessbauer effect as a "*recent* example," but can it be *that* recent?

RAYMOND GRAUDIS
Milltown, N.J.

The Mössbauer effect is about thirty years old, and the correct spelling is the German one in this sentence. Both of the spellings you mention are in common use among people who don't have umlauts on their typewriters.

Dear Stan:

A minor point, but . . . after having gone through some pains to distinguish "force" and "mass" in my ozone rocket article, it annoys me muchly to be accused of "blunders of an elementary nature" by Dr. Howard Mark (letters, March '86). Such obfuscatory pedanticism replaces physics with semantics.

Out here in the Real World, "pounds" are used indifferently for both force and mass (if you insist on using English units, that is), and you must determine which is meant from context. In fact, pounds (or tons, or ounces) are the usual mass unit; I have *never* seen slugs used except in first-year physics classes. (Pacific Northwest scientists, myself included, think of slugs as shell-less terrestrial gastropods.) Moreover, in most contexts interpreting "pounds" as force would be absurd: e.g., insulation specifications in pounds per cubic foot, structural steel in pounds per linear foot, industrial chemicals in pound or ton lots, assays in ounces per ton; presumably the customer is buying *mass*, not force! As I noted, too, rocket engineers have traditionally used "pounds" both for force and mass, by which they arrive at "seconds" for specific impulse. (If Dr. Mark would bother to look up the conversion factors in the CRC tables, he will find that conversions for pounds *force* and for pounds *mass* are intermingled; the editors evidently assume you know which you want. I had looked up the exact conversion factor to convert kilograms to pounds mass, because I knew that some *Analog* reader would tell me if I botched a decimal . . .)

Historically, too, the pound is a unit of mass; e.g., when the US legalized the metric system in 1866 or thereabouts, the pound was redefined in terms of the standard kilogram in France, instead of as the British standard pound. "Slugs" were invented when English-speaking physicists devised (for some reason) an alternative to the metric system. (To make things even more complicated, there is the further distinction between pounds avoirdupois—everyday pounds—and pounds troy, used for

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some special purposes. Because of historical accidents, they are not the same. We earth scientists have to be especially careful of troy units because they are *still* traditionally used for precious metals. Gold "prices per ounce" are troy ounces. Troy measures, furthermore, have never been interpreted as force units.)

Now, obviously, using the same name for a unit of force and a unit of mass can get you into deep trouble. It works only if you realize that to treat force as equivalent to mass you are assuming a standard acceleration, in this case one g. (See Halliday and Resnick, a standard "first-year" text!)

It is ironic that metric engineers have commonly (and inexcusably!) propogated a similar confounding of mass and force; it's not hard to find pressure gages calibrated in "kg/cm'2"bastard units indeed! As I mentioned metric rocket engineers also measure specific impulse in seconds.

(By the way, I am quite aware that there are two metric systems [actually, there are three, since SI is not *quite* the same as MKS]; paleomagnetism, my own field, traditionally has used cgs electromagnetic units, and is currently all in a dither about converting to SI. It is a dispute in which the signal to noise ratio has been running very low; due to semantics, again.)

At any rate, the point is not whether pounds are "really" mass or force; the point is that mass and force must be distinguished if the physics is to work. I tried to point this out in the article, obviously with incomplete success.

Ad astra,

STEVE GILLETT

Dear Stan,

I'd like to register a brief and unwilling objection to Lynn R. Erickson's letter in your March 1986 issue.

Erickson asks, "Is a person today literate without a basic understanding of how the ordinary conveniences used in everyday life work?"

And the answer is yes, or at least he can be. To be literate is to have knowledge of letters; the word is derived from the Latin *littera*, which means *letter* or *symbol*.

My only degree is in mechanical engineering, and I am fundamentally—and strongly—on Erickson's side. But there is a thing in engineering, familiar to every practicing engineer, called the variable constant. It is the device employed to make calculations come out as the engineer (more often, his boss) wishes. It is cheating. When we make words like *literate* mean something they do not in fact mean, we are using a variable constant; and it seems to me that when we do we undermine our own position.

GENE WOLFE

Dear Stanley and Tom:

I'm writing to you to address a matter of journalistic credibility . . . that is, if one accepts the premise that book reviews are a form of journalism, as I do. In this particular case, I'm referring to Tom Easton's recent review of Mike Resnick's new novel, *Santiago: A Myth of the Far Future*, which ran in the March issue of *Analog*.

I have no doubt that Resnick's book is superb (even though I haven't read it yet) and its merits, or demerits, are not the issues I wish to approach. However, I couldn't help but notice that Tom's review ran in the very same issue that Resnick's publisher, Tor Books, took out an inside-page ad in Analog pushing *Santiago*. Okay, a coincidence; Easton based his review on a pre-release

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galley proof he had received from Tor. As a journalist who reviewed SF for daily newspapers, I know how convenient it is for a reviewer to get preview copies before the books hit the stands, so that one may read the work and write the review in time for the review to be printed while the book is still on the stands (acknowledging the high turnover-rate among paperbacks especially that which exists in bookstores). I don't even make any bones about getting free copies; I'd go broke if I had to pay for all the books—as well as all the movie and concert tickets—I received *gratis* in order for me to do my job.

However, today I purchased a copy of *Santiago*, largely on the basis of the glowing review Easton gave it in *Analog*. The copy is brand-new, as I write; it hasn't been in the bookstores for more than two or three days. On the blurb page behind the cover, what do I find but an excerpt from Tom Easton's *Analog* review . . . a review which appears in the issue of *Analog* which appeared only about a week before *Santiago* was released.

When I once queried *Analog* about submitting a non-fiction piece, Stanley, you explained to me in a memo that *Analog* has a lead-time of at least six to eight months. As well, it is a well-known fact that paperback novels take several months to design, typeset, package, and print (with the rare exceptions; say, when Bantam and Dell rushed into print the transcript of the Watergate tapes within a few days of the Nixon White House's releasing them to the public). For a paperback containing a review excerpt to appear *at the same time* as the review itself has appeared in print . . . *in the very same week* . . . means that something unusual occurred.

Obviously, the only explanation is that after Tom Easton wrote his glowing review of *Santiago* for *Analog*, based upon his reading of a galley proof, he and Stanley Schmidt sent a copy of that still-unpublished review to Tor, with permission to print an excerpt in *Santiago*. At the same time, someone at Tor thought it would be a lovely idea to run an ad for *Santiago* in *Analog*. Coincidentally, or maybe not so coincidentally, that ad ran in the same issue when Easton's review was printed.

There's nothing illegal in any of this, but I'm not so sure that it's kosher for a reviewer, who should at least pretend to have an unbiased interest in the works he's reviewing, to be cooperating to such an extent in the marketing of a book which he's reviewed, or for his editor to allow such mutual backscratching to occur. It simply rigs the game against the book-buyer, who's depending on the reviewer to give him or her an opinion of the work at hand that is honest and unswayed by whatever advertising campaign the work's publisher is planning.

I would like to hear whatever explanation *Analog*'s editor can make for these coincidences, and in fact I think your readers are entitled to such a "full disclosure." Frankly, I don't think I'm again going to trust any reviews in *Analog* that are printed about books which are being advertised in the same magazine.

ALLEN M. STEELE, JR.
87 Birch St., Apt. 5
Worcester, MA 01603

I appreciate your concern; however, we take pains to ensure that there is no "mutual backscratching." Books are reviewed by one person, and ads are sold by someone else; the two operations are kept quite separate and independent. It's true that book publishers send reviewers galleys as a matter of

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standard practice, and we send galleys of reviews to publishers—not for approval or disapproval, but only as a courtesy in case they want to use any favorable quotes in their ads. Unfavorable quotes simply don't get used that way (for obvious reasons), but they certainly occur in reviews—even of books advertised here.

It is, of course, conceivable that an advertiser might try to influence reviews of his books by such means as threatening to pull his ads; we simply refuse to be influenced that way, since it would destroy the integrity and defeat the purpose of having a review column. Actually, it would be very unusual for a publisher even to suggest such a thing, since he would realize that (a) without his ads, all that our readers will see about his book is our reviewer's negative comment, and (b) any attempt to do such a thing could lead to very damaging publicity for him.

Dear Mr. Schmidt:

I have been a fan of science fiction thoroughly enjoying the future scenarios so well described and explored. However, since reading R. B. Fuller's book *Synergetics* (1975), my fannish view of SF has now become one of an exasperated reader and critic.

Science fiction writers are "flat Earthers": geocentric, using common cubical and flat Earth cliches, spatial misconceptions, and visual illusions in their descriptions and scenarios occurring off planet in the Universe. In other words, their whole experience is so gravitationally surface bounded and cubical that they haven't been able to easily nor successfully visualize the Universal spherical reference system wherein their stories are taking place. This conflict of Geocentric Gravitational Visual Reference System (GGVRS) versus the Free Fall (Universal) Visual Reference System (FFVRS) is also the main factor which causes about 45% of space travelers to become space sick.

To summarize the differences between GGVRS and FFVRS: GGVRS —horizontal/vertical motionless flat planes, three-dimensional, straight lines, "up/down," closed orbits, cubical references (perpendicular/ parallel), motionless; FFVRS—always in motion, complexedly curved, minimum of four dimensions, perptual, finite, spherical, gravitationally convergent/radiationally divergent (inward/outward), minimum structural polyhedron is a tetrahedron, etc. The context of differences between the two would involve more descriptions than could be explained in a letter length. Suffice to say, though, there are distinct and unique characteristics and differences between "our" GGVRS bounded perceptions and the Universe's FFVRS reality.

CHET TWAROG

Interesting hypothesis, but it needs work. E.g., do you really know *how much of the space sickness problem is due to how people were taught to see and how much of the bias is "wired in"?*

Dear Mr. Schmidt,

Thank you for George Guthridge's article "Eskimos Solve the Future." It reminded me once again of two things. The first is that young people do have the capacity to address complex problems in creative ways. The second is the effect a truly outstanding teacher makes on a classroom. By all the "normal" expectations, the education in Gambell, Alaska should be suffering. The students are bilingual. The cultural educational system is different from the traditional formal educational system. The school district is isolated and ap-

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pears not to be well off financially. On the contrary, the Gambell students' achievements are sufficiently far above the norm that they are hard to believe. This brings a question to mind. Is George Guthridge's article science fiction or science fact?

LARRY BABB

It may sound like fiction, but it isn't. Actually, I don't even find it that hard to believe—but then, I've been lucky enough to have a few teachers like that!

Dear Mr. Schmidt:

Congratulations to David Brin for his editorial "The Dogma of Otherness." Some people are so concerned to avoid judgement and to find value in every idea that they are reluctant to assert that anything is true. If they met a member of the Flat Earth Society they would not say, "You are mistaken. The Earth is round." They would say, "The statement, 'The Earth is flat,' is true for you but false for me.' "

Although I have not heard that particular statement, I do not think it is an exaggeration. People have insisted to me—in correspondence, not in the heat of spoken conversation—that the statements "Whatever else Jesus may have been in addition, He was God incarnate" and "Whatever Jesus may have been, he was not God incarnate" can *both* be true.

I prefer G. K. Chesterton's observation: "There is something to be said for every error; but, whatever may be said for it, the most important thing to be said about it is that it is erroneous."

MARTIN W. HELGESEN

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a calendar of analog upcoming events

3-5 October
CONTRADICTION 6 (Niagara frontier area SF conference) at Hotel Niagara, Niagara Falls, N.Y. Guest of Honor—George R.R. Martin. Registration—$10 until 20 September, $15 thereafter. Info: Contradiction, 1356 Niagara Avenue, Niagara Falls NY 14305.

3-5 October
JAFCON (Utah SF conference) at Quality Inn Center, Salt Lake City, Utah. Guest of Honor—Roger Zelazny. Info: Jafcon, Box 510232, Salt Lake City UT 84151.

4-5 October
ENCOUNTER 10 (SF, Fsy & Comics conference) at Hilton Inn—East, Wichita, Kans. Special Guests: Fritz Leiber, Gene Roddenberry. Registration—$15 in advance; $10/Saturday, $8/Sunday, $15/both. Info: FANdom, Box 1675, Wichita KS 67201.

10-12 October
ARMADILLOCON 8 (Texas area SF conference) at Sheraton Crest Hotel, Austin, Tex. Guest of Honor—William Gibson, Fan Guest of Honor—Debbie Notkin, TM—Lewis Shiner. Registration—$10 until 1 October, $15 at the door ($6/day). Info: Armadillo Con 8, Box 9612, Austin TX 78766.

10-12 October
CONCLAVE XI (Michigan SF conference) at Plymouth Hilton, Plymouth, Mich. Guest of Honor—Greg Bear. Fan Guests of Honor—John and Joanne Hall. Registration—$14 until 26 September; $16 at the door. Info: Conclave XI, Box 2915, Ann Arbor MI 48106 (checks payable to Waldo & Magic.)

10-12 October
ROVACON 11 (Tidewater area SF conference) at Salem High School, Salem, Va. Guest of Honor—Alan Dean Foster, Media Guest of Honor—Walter Koenig. Costume contest. Rgistration—$12 until 1 September, $15 thereafter, children $5, students $10. Write for group rates. Info: Rovacon 11, Box 117, Salem VA 24153. (703) 389-9400.

17-19 October
CONTACT '86 (Indiana SF conference) at Ramada Inn, Evansville, Ind. Guest of Honor—David R. Palmer, Fan Guest of Honor—Timothy Zahn, TM—Roger Reynolds. Registration—$12 until 1 October, $15 thereafter. Info: Contact '86, % RCSFA, Box 3894, Evansville IN 47737.

17-19 October
FANTASTICON 6 (northern California SF conference) at Redding Holiday Inn, Redding, Calif. Guest of Honor—Larry Niven, Fan Guest of Honor—Frank Denton, TM—Ed Bryant. Info: Northern California SFA, Box 781, Red Bluff CA 96080.

18-19 October
PRISM (Kansas SF conference) at Holiday Inn, Lenexa, Kans. Guest—Gene Roddenberry, Daryl Murdock, Robin Bailey, Jan Gephardt; Artist Guest of Honor—Lucy A. Synk. Registration—$20. Info: Prism, 2217 Denver Ave, Kansas City MO 64127.

30 October-2 November
World Fantasy Convention 12 (print-oriented fantasy conference) at Biltmore Plaza, Providence, R.I. Guests of Honor—Ramsey Campbell, Charles L. Grant, J.K. Potter. Registration $45 in advance; NO at-door memberships. Info: 12th World Fantasy Con, Box 3251, Darlington Branch, Pawtucket RI 02861.

30 October-2 November
NECRONOMICON '86 (Tampa area SF conference) at Tampa Airport Holiday Inn, Tampa, Fla. Guest of Honor—Frederik Pohl. Registration—$10 until 1 October. Info: Stonehill SFA, Box 2076, Riverview FL 33569.

—Anthony Lewis

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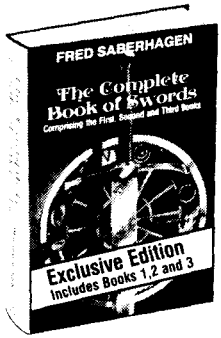

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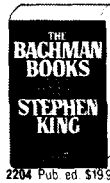

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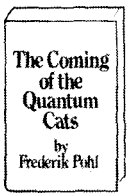

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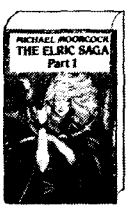

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